# IRON & COAL

THE IRON AND COAL TRADES' REVIEW

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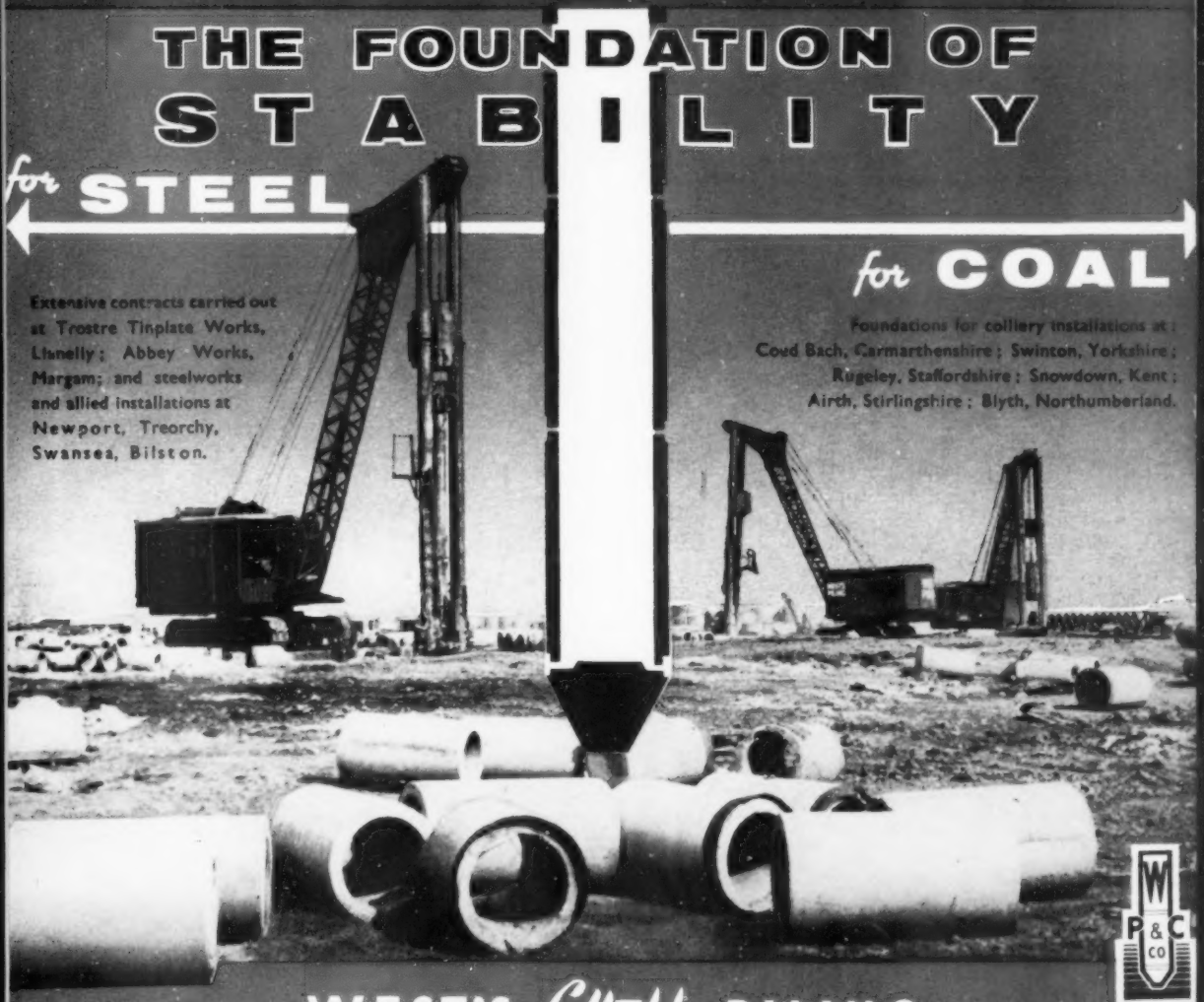

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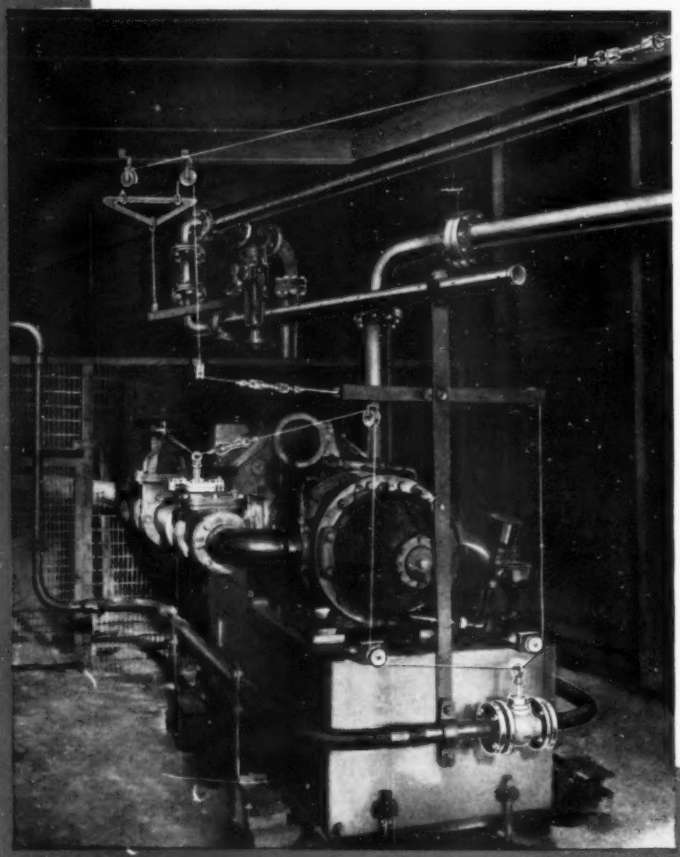
## AUTOMATIC FIRE PROTECTION FOR METHANE DRAINAGE INSTALLATIONS

## AUTOMATIC THERMAL VALVE

PATENT NOS. 803861 AND 803862



### WATER BARRIER

Water barrier created in pump house and 50 yards of roadway on collapse of a fusible link or links at the very low temperature of 140 deg. F.

### PUMP STOPPED

Simultaneously with the collapse of a link the pump is stopped by the automatic operation of a special shut-off valve on the compressed air intake of the pump.

### NO SEEPAGE

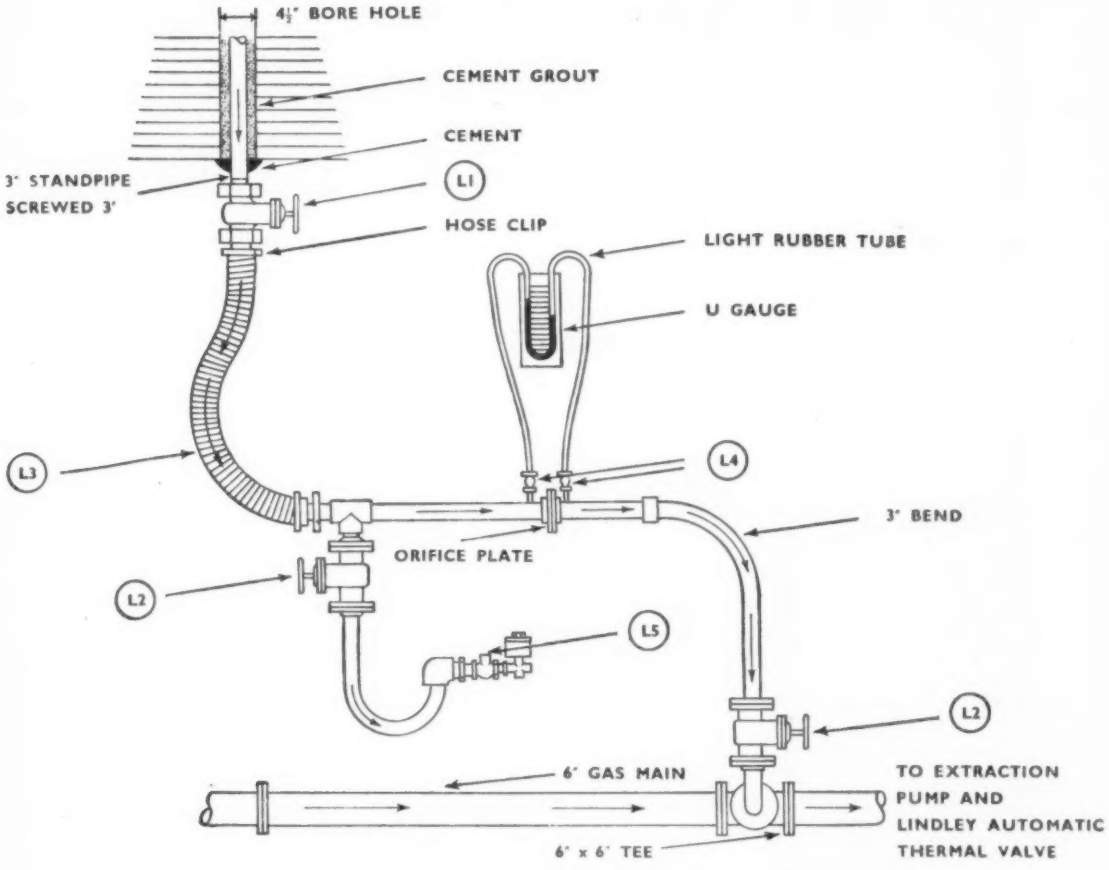
Drawing off and seepage of methane through the pump is automatically stopped by a special shut-off valve on methane range into pump.

Any number of collapsible links can be fitted to one valve in anticipation of possible risks.

**YET ANOTHER LINDLEY "PIT JOB"**

Typical Installation of Lindley Automatic Thermal Valve on a Methane Extraction Pump

# LINDLEY VALVES & FITTINGS FOR INDIVIDUAL BORE HOLES




**L1** LINDLEY 3" SCREWED GUNMETAL FULLWAY GATE VALVE

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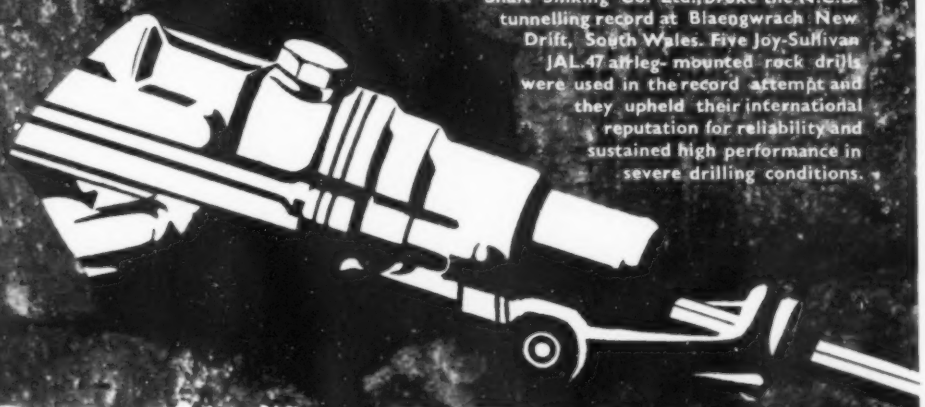

# ROCK DRILLS

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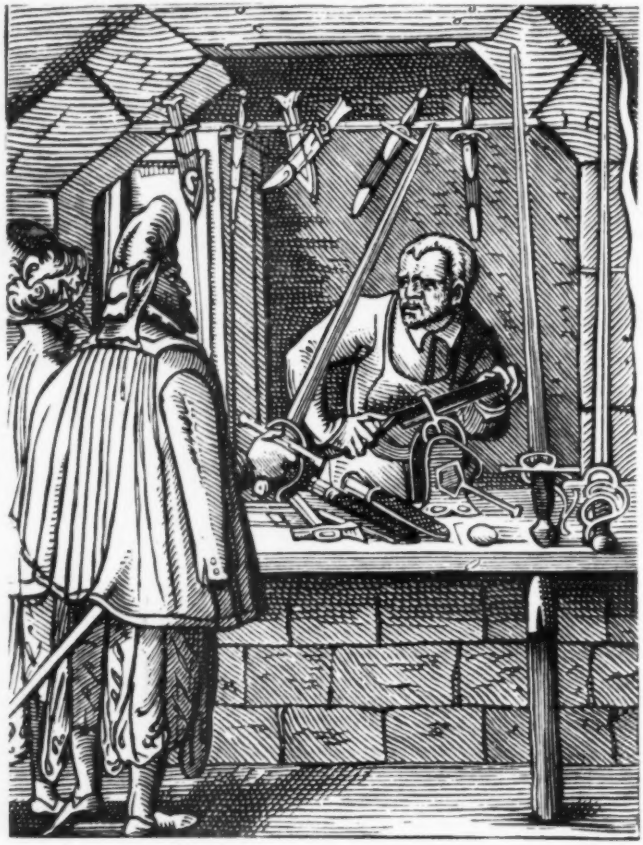

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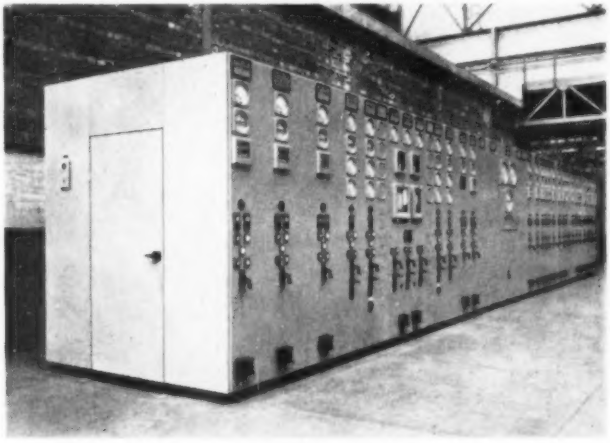
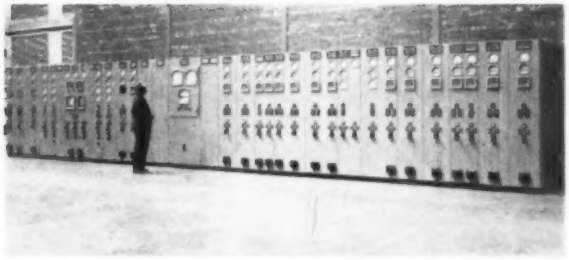
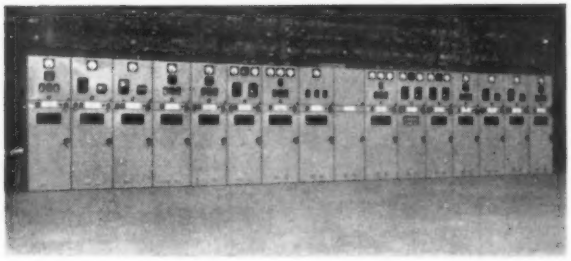
# NEW PLATE MILL AT CONSETT







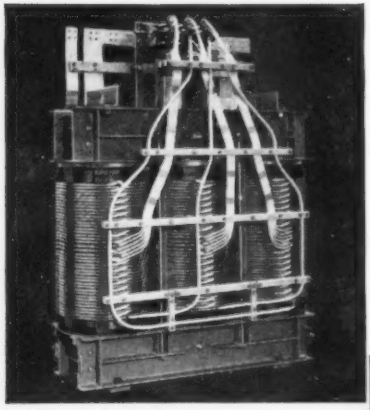
All the main distribution switchgear at the Consett Iron Company's new plate-mill installed at Hownsgill has been supplied by Reyrolle.

It comprises 11-kV 750-MVA and 350-MVA metalclad oil-break and 3·3-kV 150-MVA air-break switchgear, together with its associated control equipment.

**Reyrolle**

*A. Reyrolle & Co. Ltd - Hebburn - County Durham*

# Large — medium — small



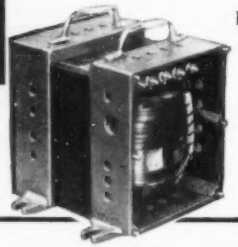
## TRANSFORMERS

by Hackbridge

ABOVE: One of three 100 MVA 220 kV type ON transformers for Tasmania.

CENTRE: 1500 kVA distribution transformer for the Far East.

BELOW: Low power multipurpose unit.



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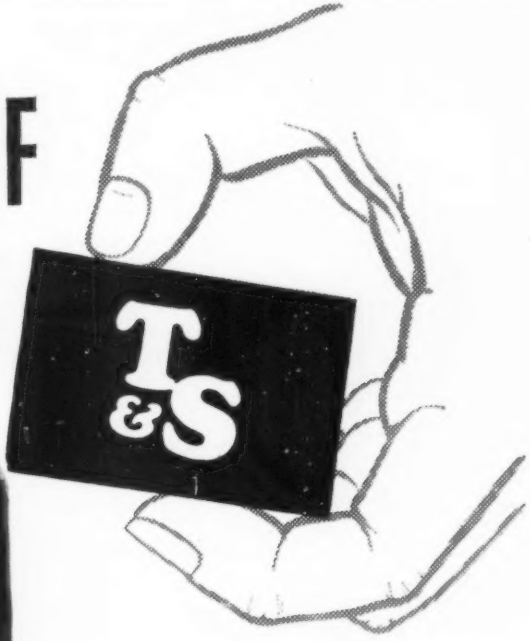


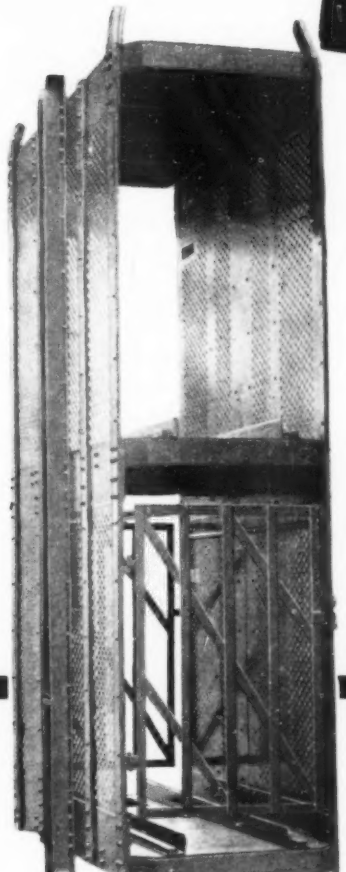

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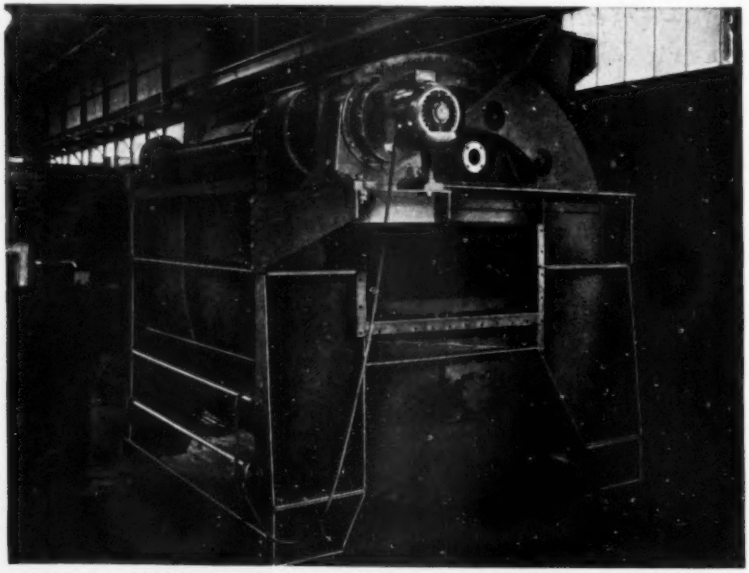

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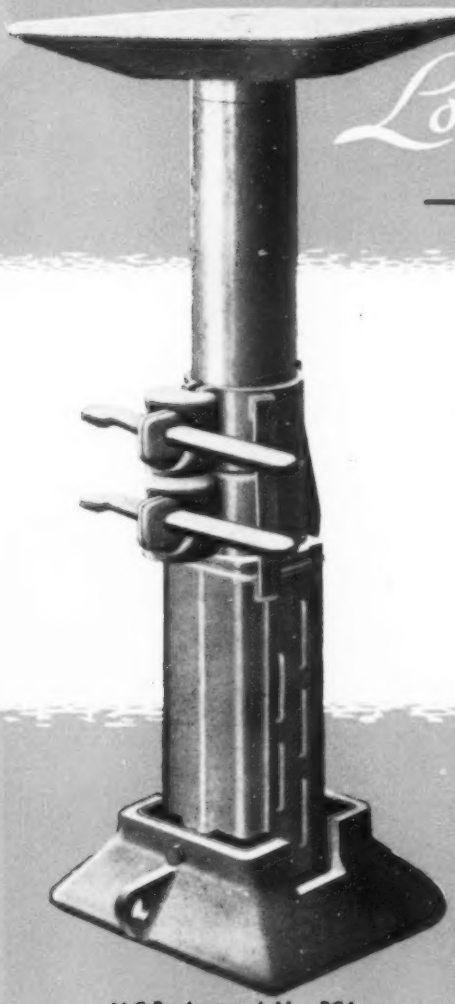

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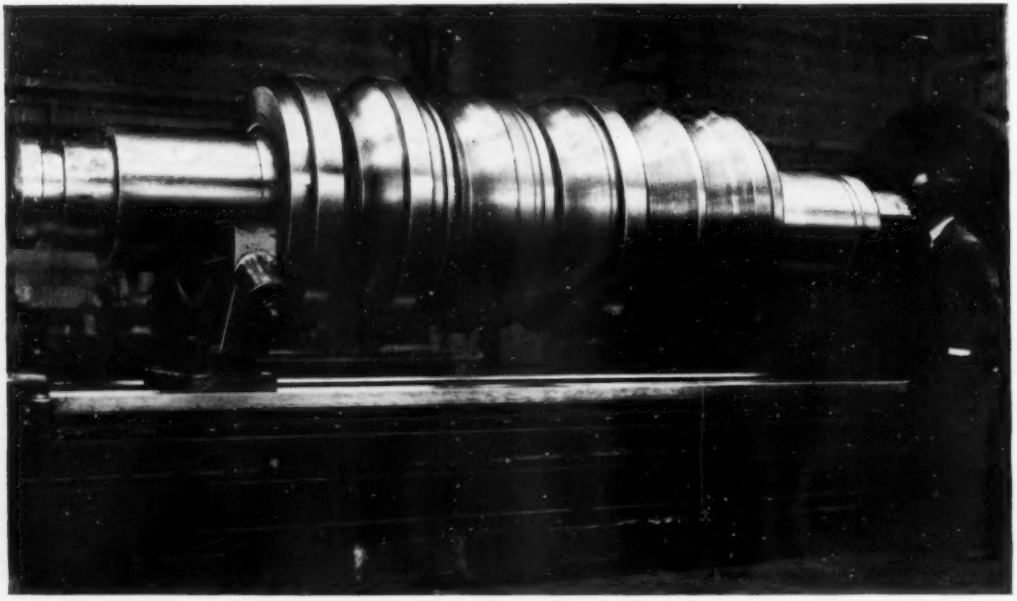

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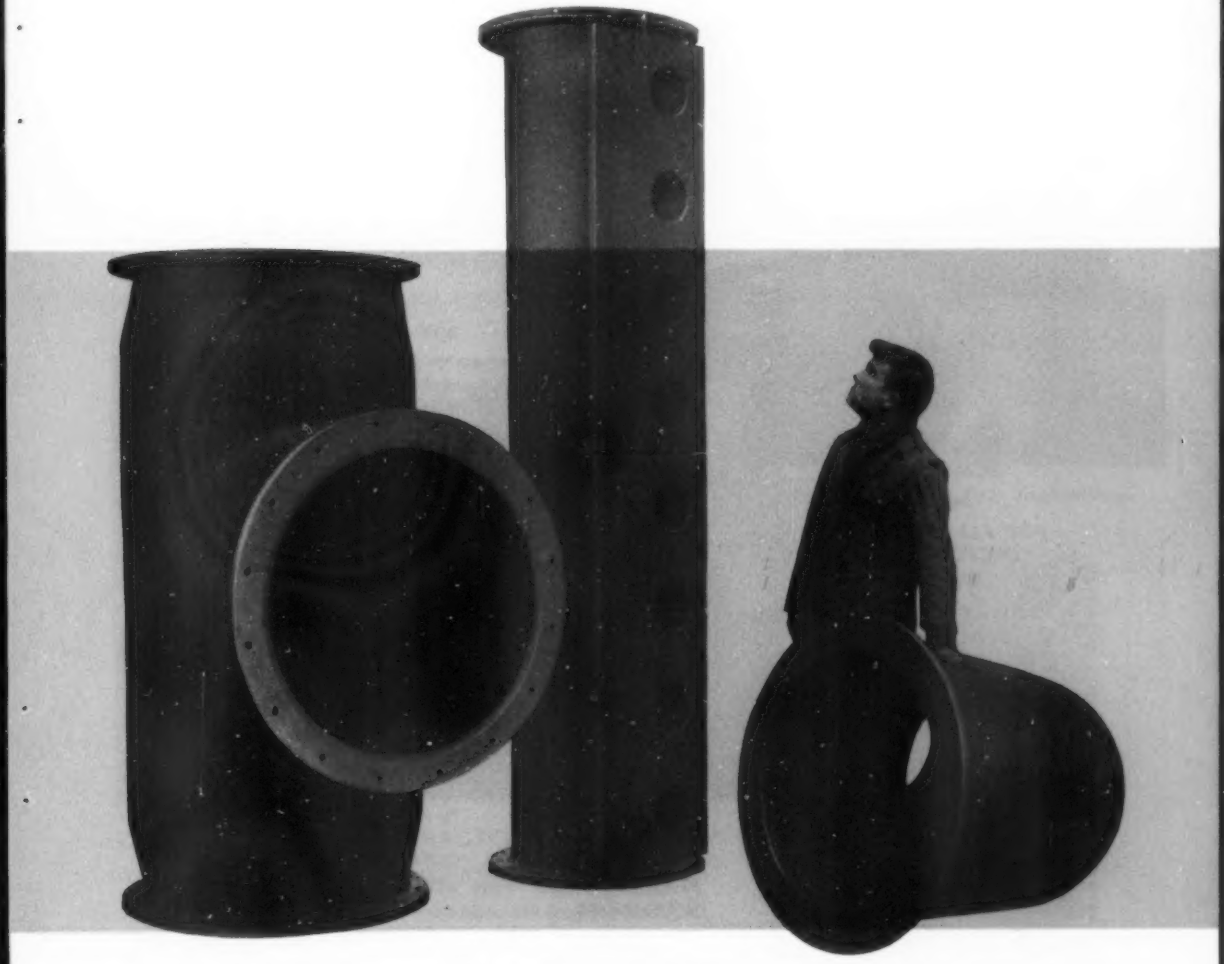

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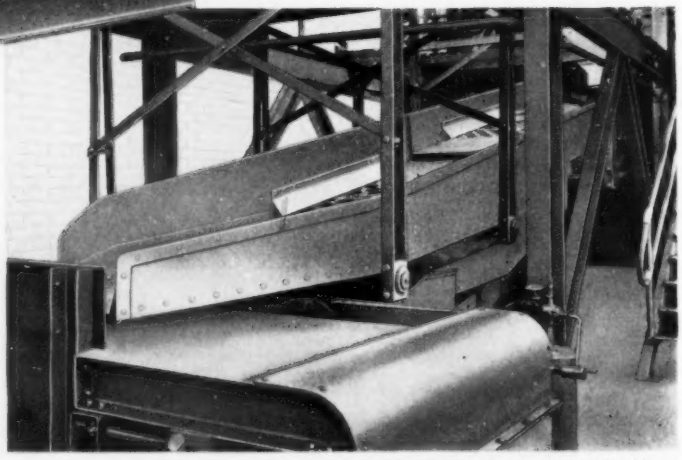

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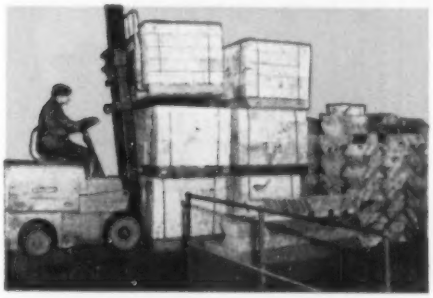
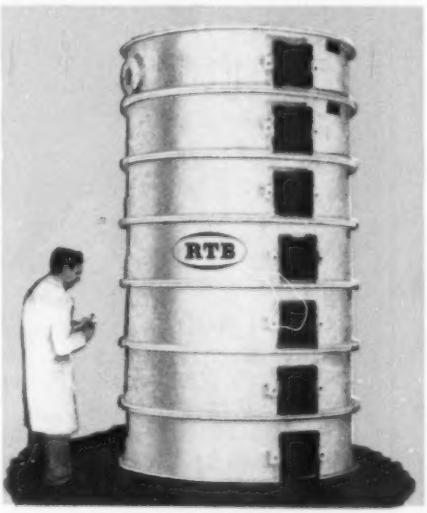
*(Left) 14 cwt. capacity ingot mould. (Right) 20-ton capacity ingot mould.*

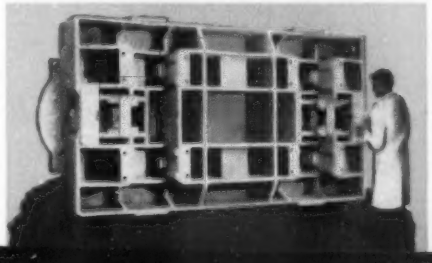


*Silica bricks in one of our despatch bays.*

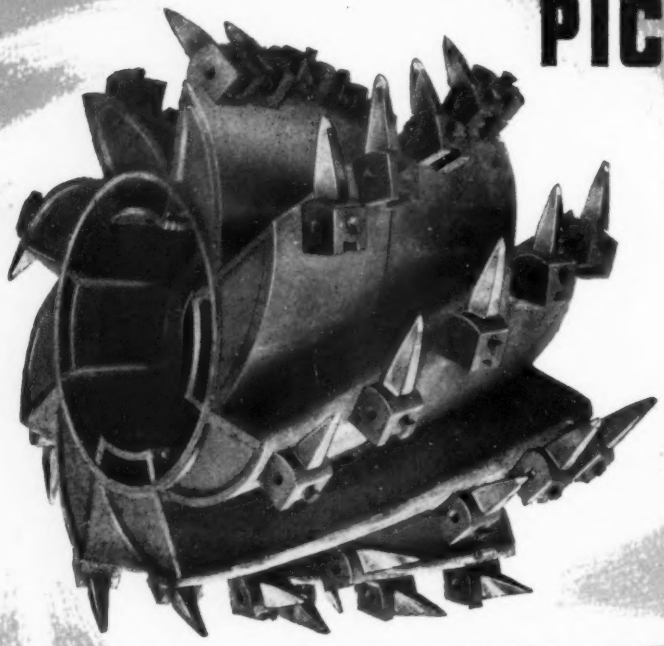



*Reactor boxes cast in spheroidal graphite (nodular) iron for the International Nickel Company (Mond) Ltd. Clydach, Swansea.*

*View of underside of 80-ton capacity ingot car supplied to Ebbw Vale Steel Works.*



# *The* HEELEY SHEAR DRUM *with* HIGHER SPEED METALS PICKS



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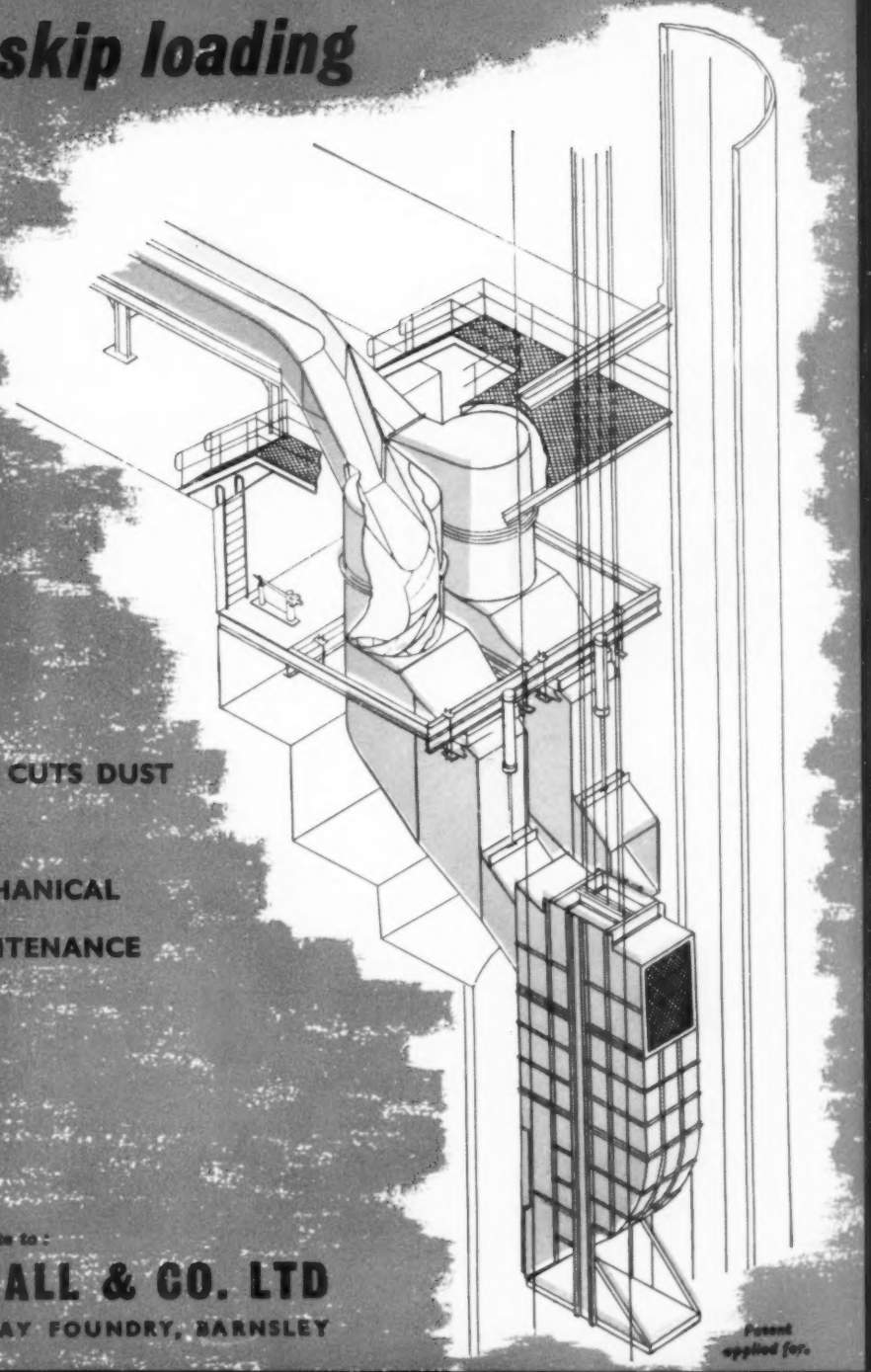

The enclosed hopper **CUTS DUST**

and the spiral chute

**ELIMINATES MECHANICAL**

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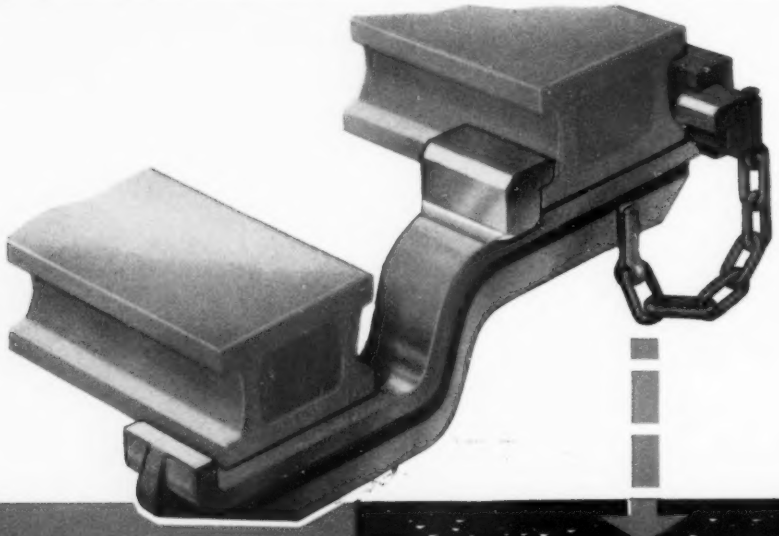
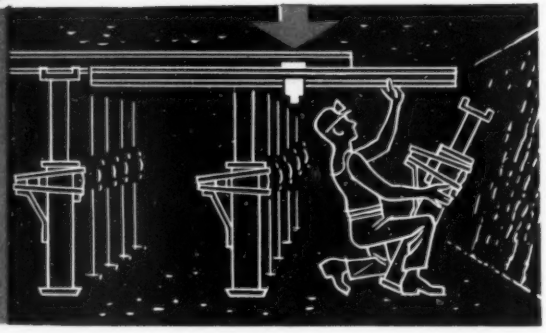


the

# BECORIT

slide bracket



reduces work and saves time

The Becorit Slide Bracket has been designed for use with stagger-bar systems of support particularly with reference to prop-free front faces. The bracket eliminates the necessity for bars to be lowered to the ground and lifted again and therefore reduces work in support setting and saves time.
It is erected quickly, is extremely robust and is suitable for use on all Groetschel Section Bars.
Brackets can be made to fit any section.

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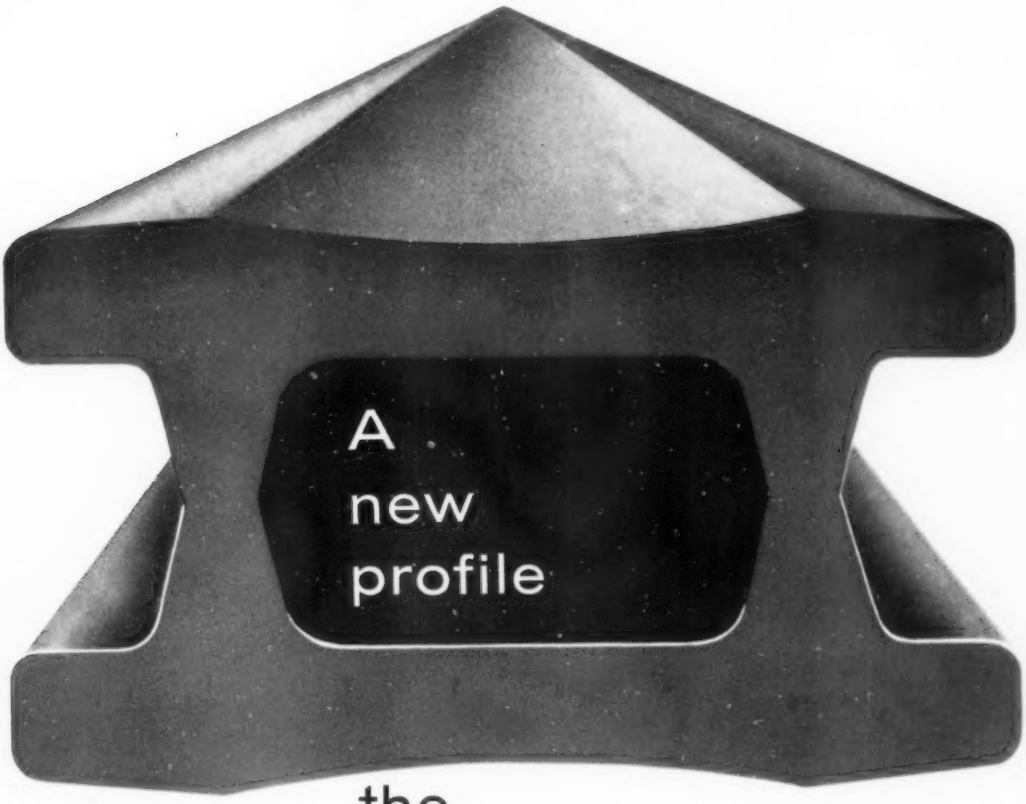
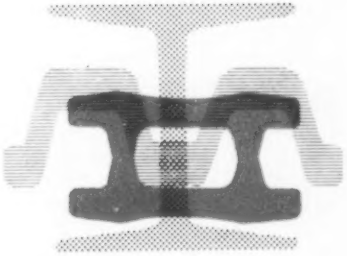



# the GROETSCHEL K. 45 Roof Bar

This Bar in an entirely new section, is made of the same special alloy steel as other Groetschel roof bars. It can be used for face or roadway support. It is ideally suited for slide bar and stagger bar systems. It's advantages include great strength for a comparatively shallow section and suitability for thin seam work.

*These bars can be supplied with fixed prop locations and in sections up to 15 ft. long. The Groetschel K. 45 Section is twice as strong as W. Section in vertical bending for comparable weight.*



Patents Applied for.

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Idler troughing angle varies with load

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Reduced coal degradation

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12" ground clearance

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Easy and rapid withdrawal

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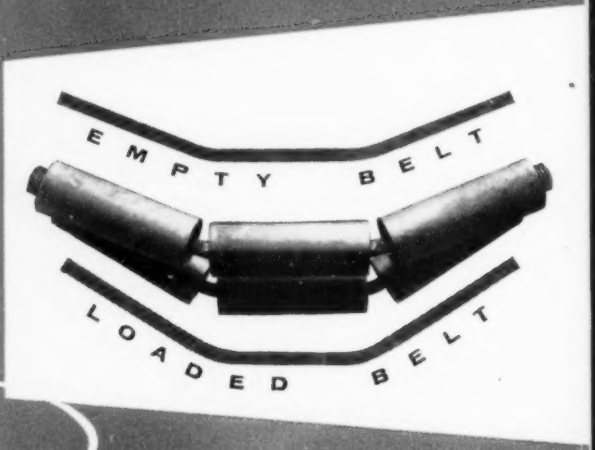


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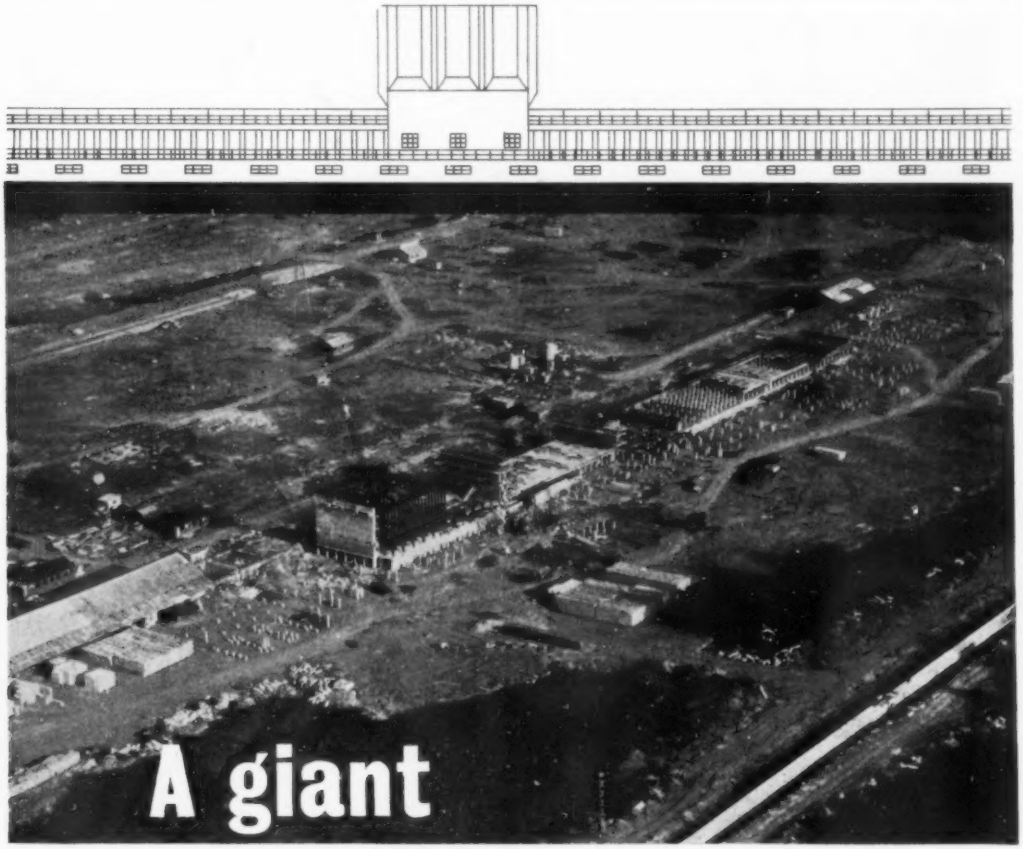


# emerges

. . . . a giant whose job it will be to serve
an even bigger giant faithfully and regularly for a great many years.
The scene is a greenfield site in Newport, Monmouthshire
and the works under construction are the 140-oven coke oven and by-product plants
we are building for Richard Thomas & Baldwins Ltd.
The plant will supply coke to the new blast furnaces at Spencer Works
and is to go into production in September.
This is one of the largest coke oven contracts placed in Britain for some years.

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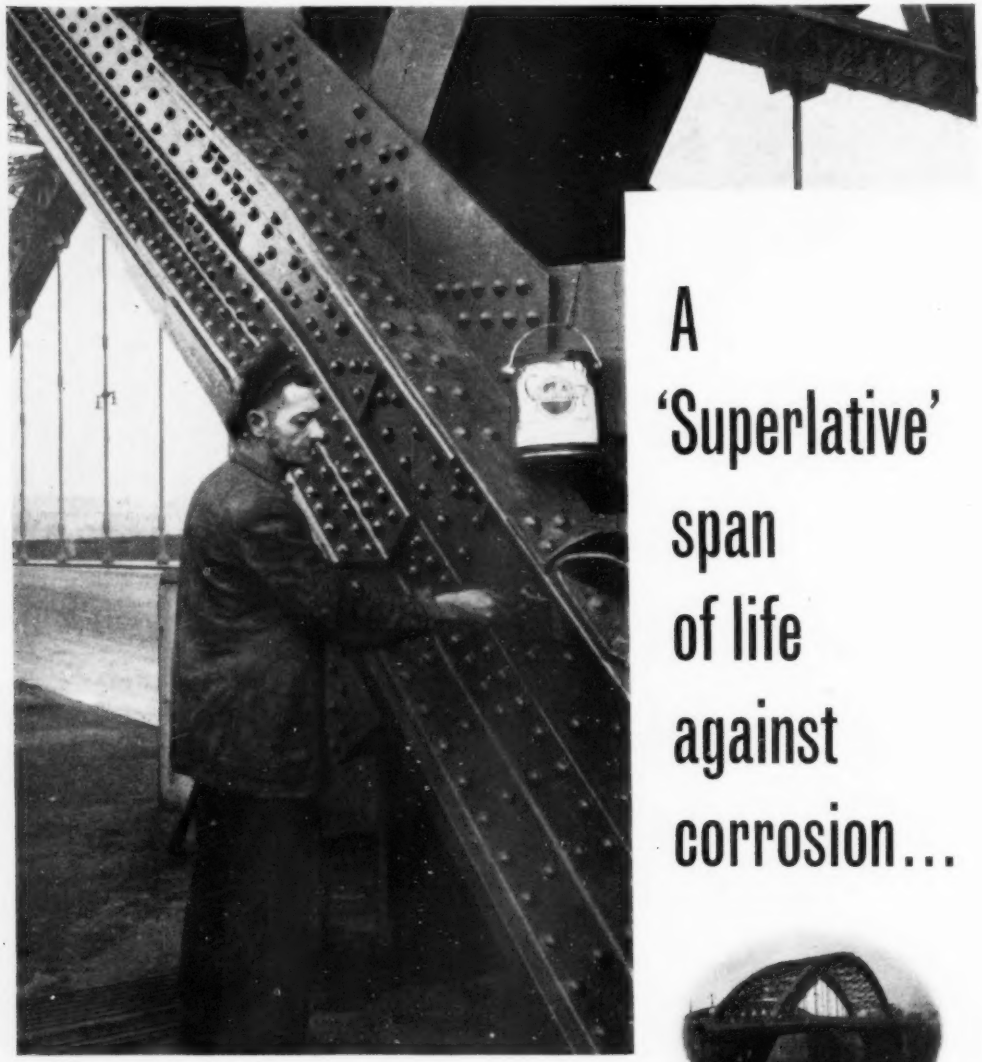

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# Water Coolers, Fume Removal, Dust Collectors, Filters add up to -

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**Engineers to Industry**

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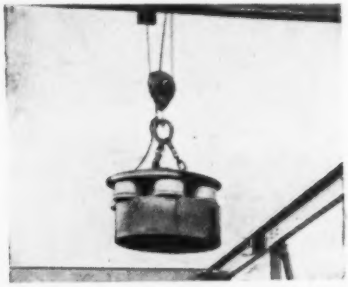
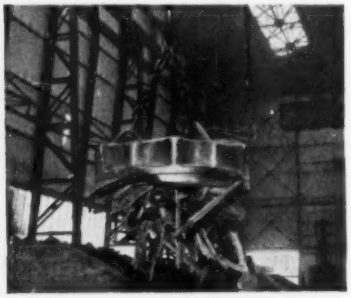
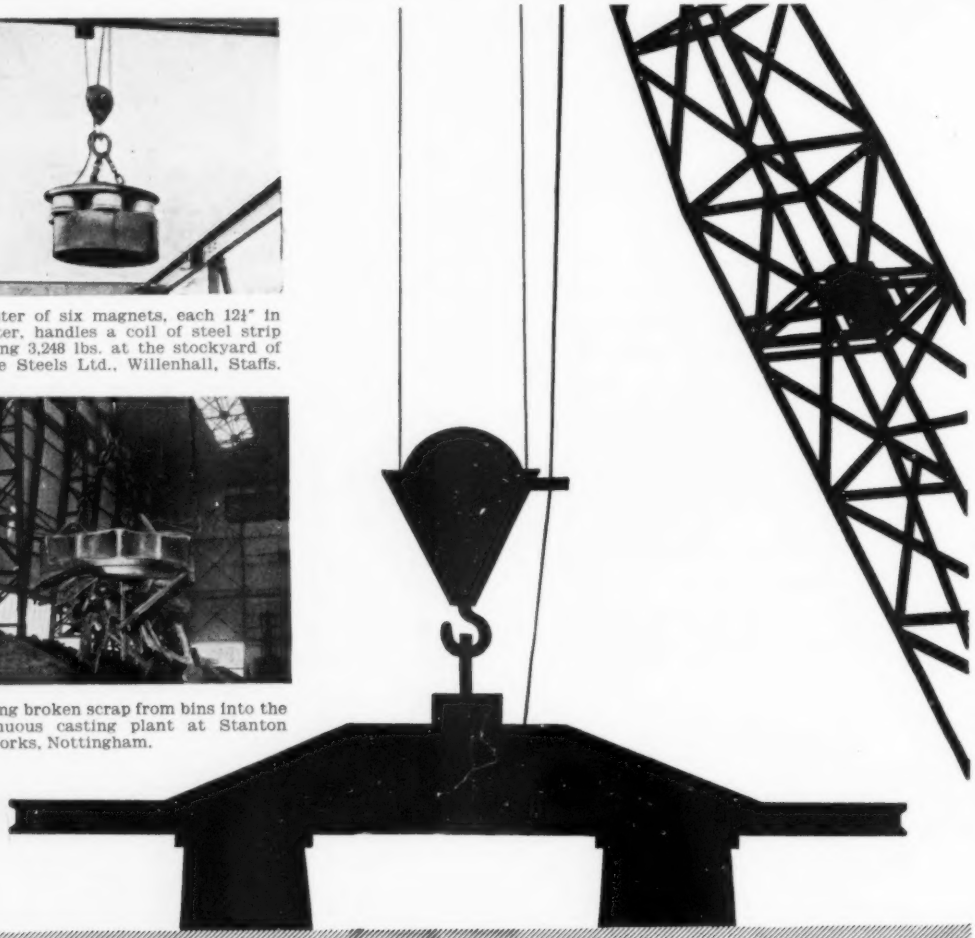


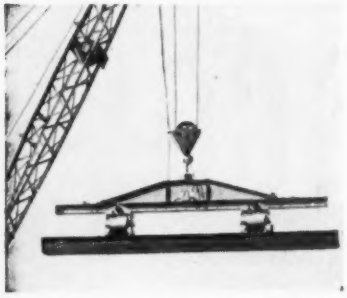
A cluster of six magnets, each 12½" in diameter, handles a coil of steel strip weighing 3,248 lbs. at the stockyard of Ductile Steels Ltd., Willenhall, Staffs.



Loading broken scrap from bins into the continuous casting plant at Stanton Ironworks, Nottingham.




# WITTON-KRAMER LIFTING MAGNETS FOR EVERY JOB



Two bi-polar magnets on spreader beam lifting rolled steel joist.

Whether handling hot steel billets and ingots or salvaging metal from under water, Witton-Kramer electric magnets do the job superbly. Circular, rectangular or bi-polar, G.E.C. makes them all with coils designed and constructed to withstand heavy duty and shock loads. All Witton-Kramer magnets are easily maintained and quickly serviced.

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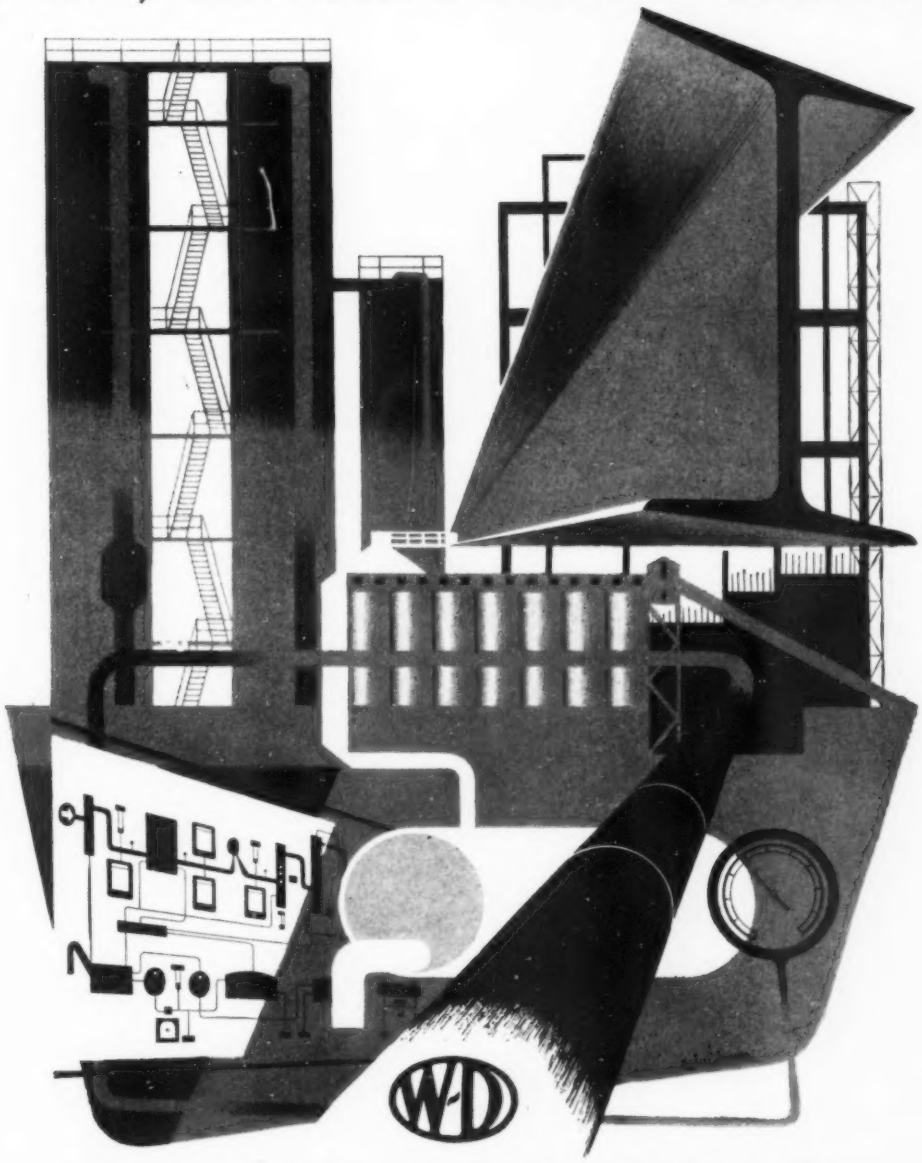

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**This is one of many such installations in ferrous and light alloy plants designed and manufactured by Wellman.**

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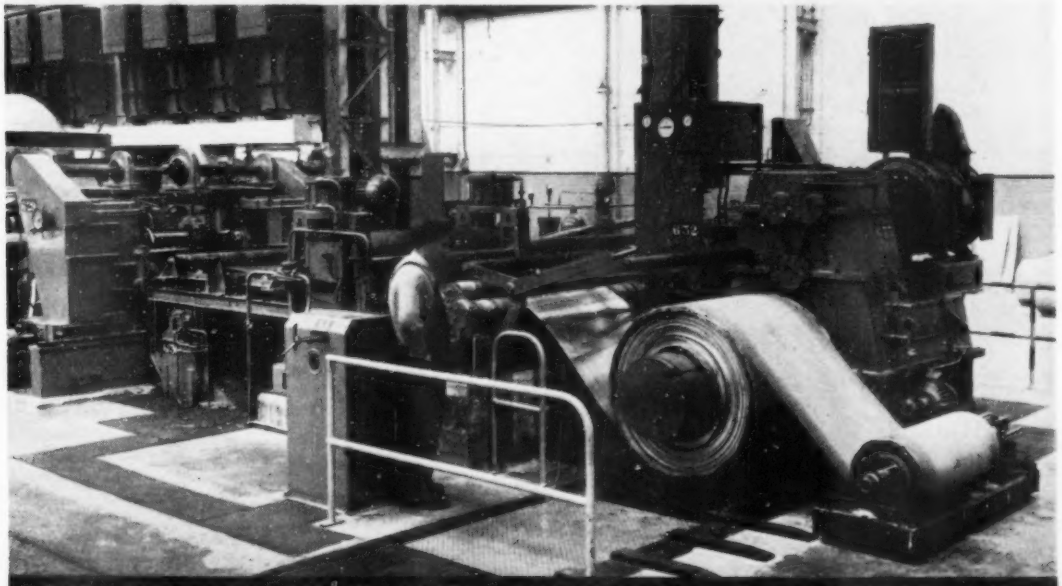

THE WELLMAN SMITH OWEN ENGINEERING CORPORATION LTD.
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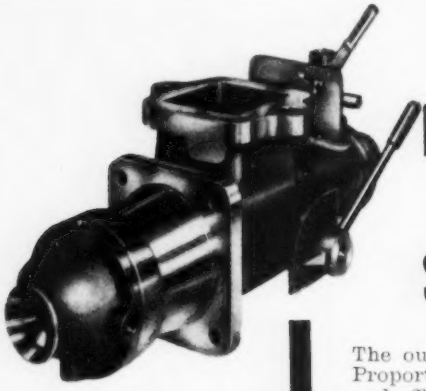

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The Burner shown has a maximum output of 12 gallons per hour and requires atomising air at 20" (51 cm) w.g. to 30" (76 cm) w.g. with oil at not less than 5 lbs per sq. in. (0.35 kgs per sq. cm) or equivalent head.

The outcome of 80 years' experience the Wallsend Self-Proportioning Low Air Pressure Oil Burner brings new ease and efficiency of control to oil burning. The single lever at the side automatically proportions oil and air quantities in the correct ratio and whatever the type of fuel.

It has, too, a turn down range of approximately 5 : 1 which can be achieved with a stable flame, efficient combustion and a high $CO_2$ content. Made with the well known Wallsend features of robustness, long service with little maintenance, and flexibility this outstanding burner leads the way, as well, to automatic or remote control of all single and multi-burner installations . . .

**THE WALLSEND SELF-PROPORTIONING LOW AIR PRESSURE BURNER**

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### from one unit to a complete scheme

There are overwhelming advantages in Sutcliffe hydraulically-operated mine car traffic systems. They are self-lubricating and introduce substantial savings, not only in horsepower: up to 80% savings in manpower have been achieved in some cases!

Sutcliffe will plan and re-organise your present traffic arrangements or plan and provide completely new schemes to ensure the safest, simplest and most economical control. Single units are also supplied.

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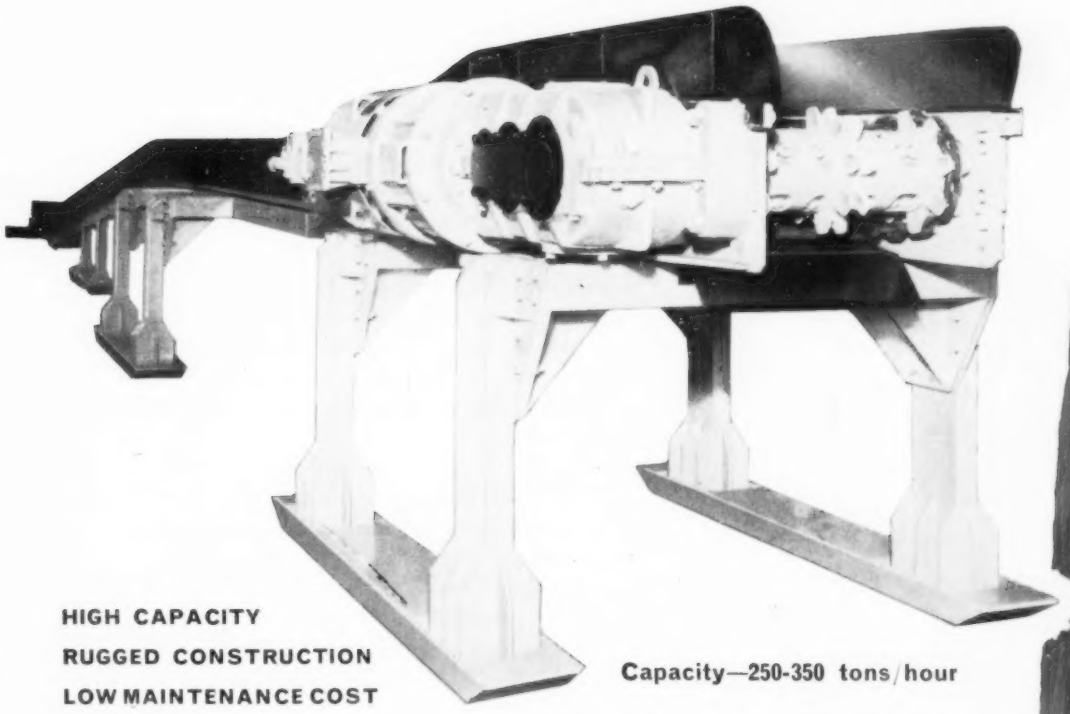
# THE CRAWLEY HEAVY DUTY SKID MOUNTED STAGE LOADER



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**Capacity—250-350 tons/hour**

*Overall width*—

Extra Heavy Duty Extensible Stage Loader, treble strand 18-mm. chain .. .. .. .. 30 in. & 36 in.

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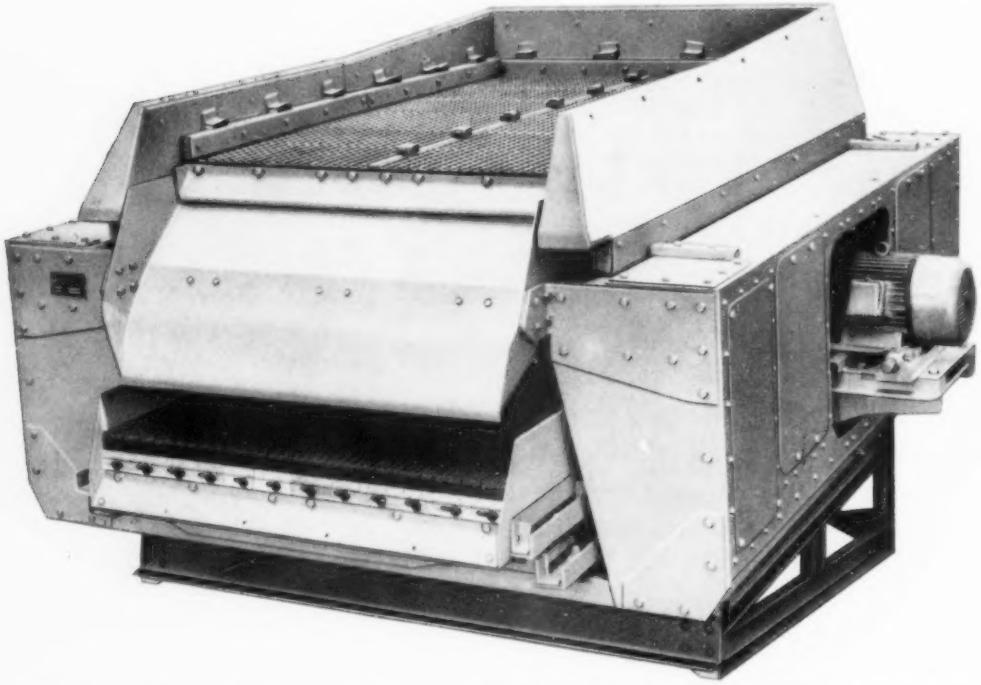
# UMBRA

(VICTOR HALSTRICK KG. HERNE)

## *FINES EXTRACTION* SCREENS



The only Fines Extraction Screens which POSITIVELY CANNOT "BLIND"

Size separation as low as 1 mm. can be effected on any coals—regardless of moisture content.

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*The introduction of the "UMBRA" Screen opens new lines of approach to many screening problems.*

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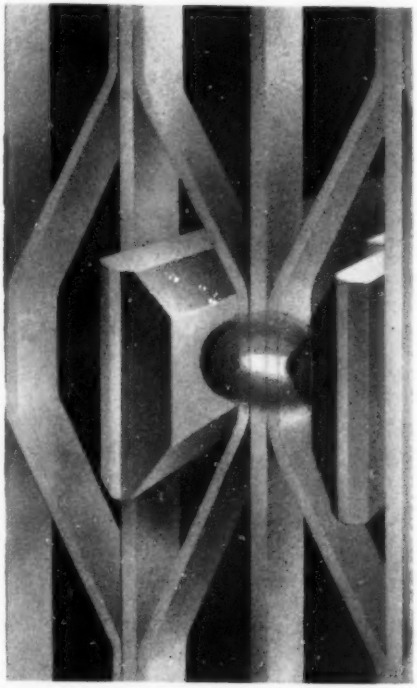
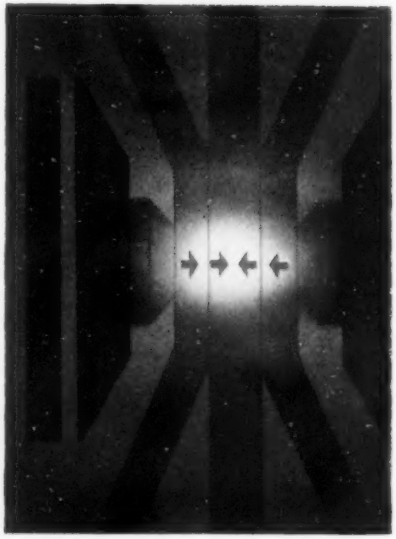


"Safetread" steel flooring is *homogeneously resistance welded under pressure*—thus closing the grain of the material and providing a highly corrosion-resistant joint of great strength. "Safetread" floors installed for many years under rigorous conditions show that the least corrosion has taken place at the point of welding. Welded through the neutral axis of the main bar, maximum strength and lateral stability is also gained.

Engineers everywhere specify "Safetread"—its unique design and construction give greatest strength and rigidity with a minimum of weight which enables valuable economies to be effected in supporting members. "Safetread" is tailor-made to your specification no matter how intricate the layout. **WRITE TO-DAY** for the "Safetread" catalogue—it's a mine of information including deflection tables, safe load tables etc., a valuable work of reference for the man with a flooring problem.



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*Fourteenth century carving of a sow and litter in Worcester Cathedral. Photograph by Ruth Meyler & F. C. Sillar*

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In the early days of the industrial revolution manufacturers frequently looked for familiar and easily recognisable descriptions of their products. To the countryman transplanted into industrial surroundings nothing was more familiar than a pig; a fact which is emphasised by carvings in scores of old churches depicting pigs suckling their litter, rooting for acorns and playing the bagpipes. (Apparently this last pastime was forsworn by pigs many years ago because of unpleasant associations between bagpipes and pigs bladders.) Consequently, when iron from Blast Furnaces was directed into long troughs and from there into short and narrow troughs placed at right angles, a resemblance to sows suckling their appendaged litter led to the description of 'pig iron'.

This series of advertisements illustrates some of the 'ecclesiastical' pigs and emphasises the 50,000,000 'special' pigs which Warner and Company have supplied to Iron Foundries producing High Duty Castings.

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*"Pioneers of* *Refined Pig Iron"*

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*Minimum Maintenance Costs . . .*
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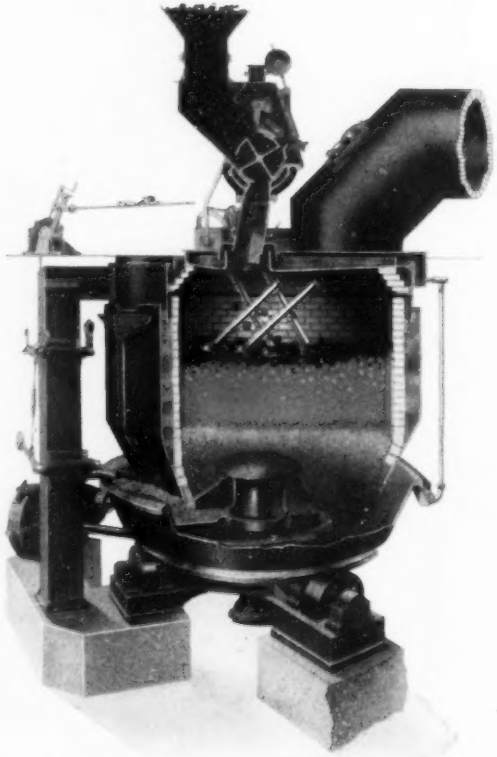

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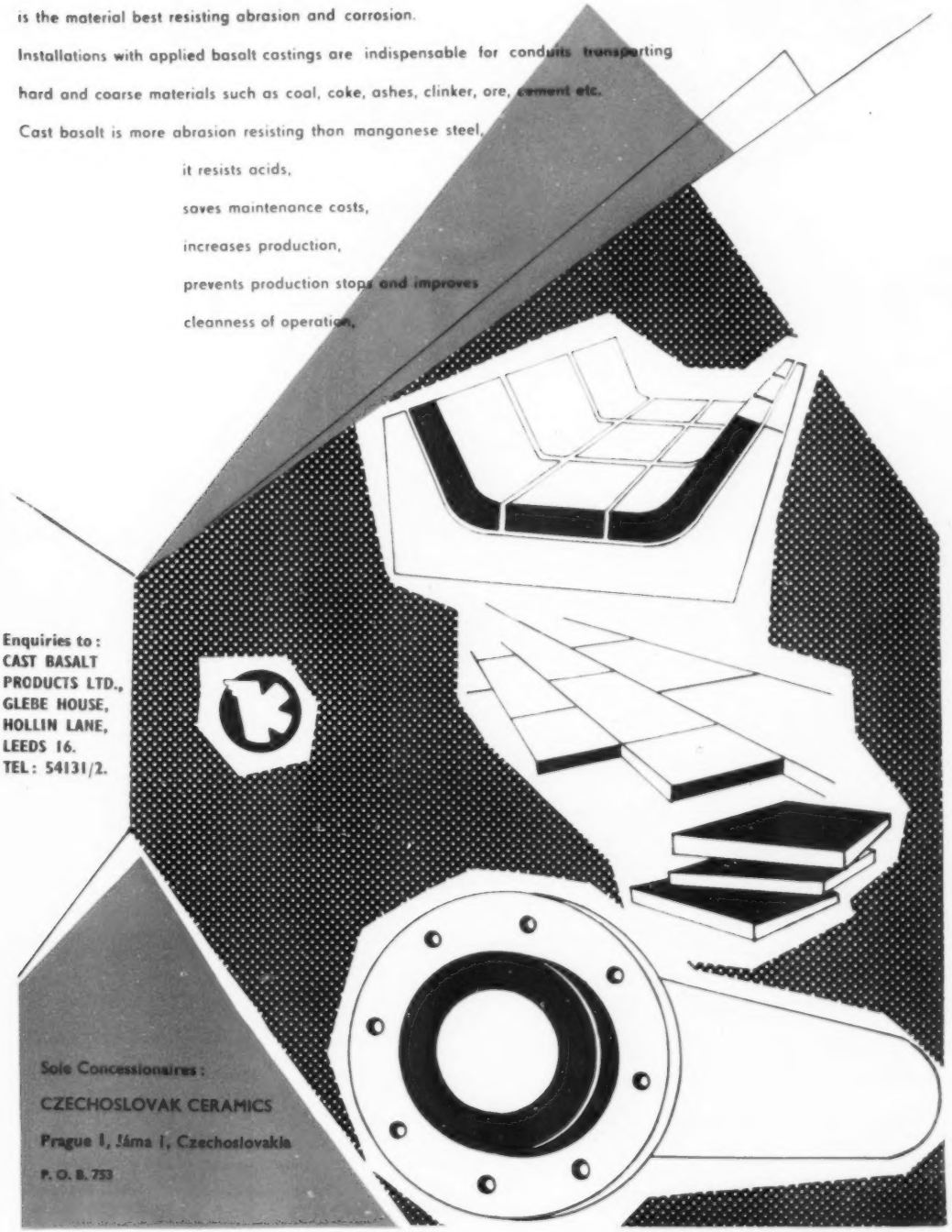

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# IRON & COAL
THE IRON AND COAL TRADES' REVIEW

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*Editor:*
F. H. HARLEY

*Assistant Editor:*
P. E. CARDEN

*Metallurgical Editor:*
C. W. J. CRAWFORD, A.I.M.

*Mining Editor:*
H. COOPER, A.M.I.MIN.E.

*News Editor:*
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*Telephone: Trafalgar 6171 (Private Branch Exchange)*
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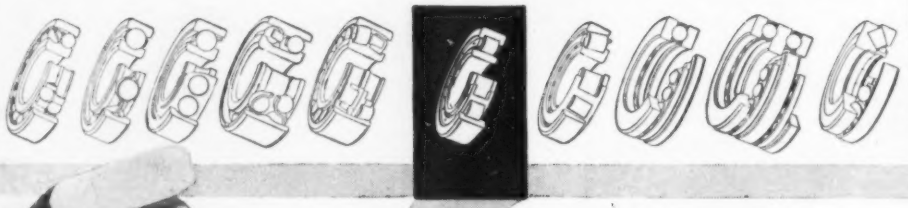

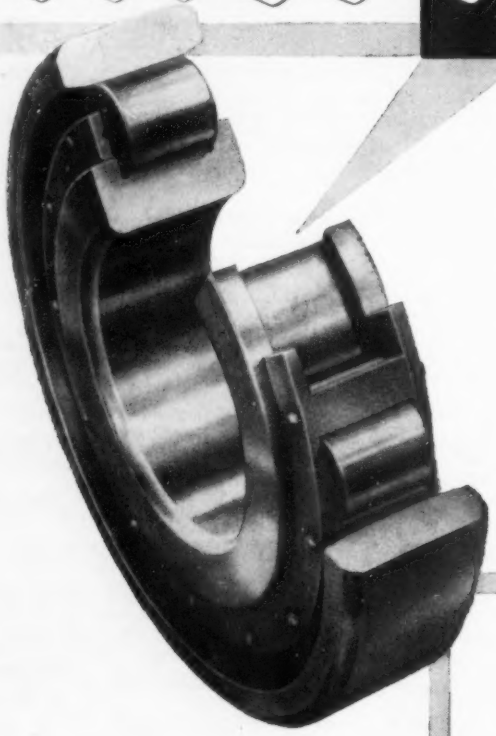

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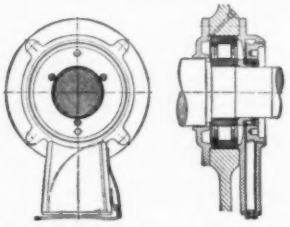

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IRON & COAL
THE IRON AND COAL TRADES REVIEW

Vol. 182 June 2, 1961 No. 4,846

# *The Kennedy Touch*

IT has taken a relatively young man like President Kennedy both to stir the world conscience and to galvanize the western industrial states into making larger contributions to the under-developed territories. According to a recent survey, the leading states of the free world contributed $27,000,000,000 over the period 1956-59, the greater part of it, namely 52 per cent., being derived from the United States of America. Well below are the chief European contributors, France, the United Kingdom, and Western Germany, which together subscribed something in the order of 38.2 per cent. of the total. Aid worked out on average at $6,900,000,000 per annum, but this has proved quite inadequate. Steps have been taken recently to recruit further assistance, and this has entailed the establishment of a series of targets for individual communities. Thanks to the initiative of Mr. Dillon, DAG was formed, and a series of meetings has taken place in Washington, Bonn, and London to increase the European contributions significantly. This body has received Western recognition and is shortly to become the Development Assistance Committee of the new OECD.

Mr. Ball suggested that a collective contribution of 1 per cent. of the national incomes of the 10 participants of DAG would be a reasonable figure at which to aim. This would yield some $7,500,000,000 to $8,000,000,000 and would allow proportionately larger contributions from the wealthier industrial states in the group. It is doubtful whether this figure is enough, but it marks a substantial step forward, and, of course, aid can only be effectively granted at the rate at which it can be assimilated by developing states. There are countless examples, particularly in the Middle East and Asia, where aid liberally granted has flowed into private coffers or disappeared in the squandermania of corrupt administrative machines. The spending agencies have since improved. Better administrative machinery is now available. A sense of urgency is fortunately now accompanied by the recognition that aid which is provided must bear fruit—a strengthening in the earnings of recipient states and an improvement in local living standards.

Another fact that has begun to emerge is a growing appreciation of the necessity for continuing aid until the developing nation can stand on its feet. Mr. Adlai Stevenson talked about substantial aid annually for a 40-year period. The impact of the Communist economic offensive on the growing communities has convinced the President (Mr. Kennedy) at least that this is an urgent problem and cannot be side-stepped. Accordingly, US economic aid is to be of the order of $2,000,000,000, largely tied to the purchase of US goods and equipment. The UK is thinking in terms of £180,000,000 to £200,000,000 for 1961, including substantial grants available under the Export Guarantees Act, 1949. This compares with some £80,000,000 in 1957-58. The United Kingdom has also announced the formation of a Department of Technical Co-operation to assist the oversea communities: a clear recognition of the fact that with the complex equipment now required and available for processing it is comparatively valueless unless "know-how" accompanies it. West Germany is making available some DM 5,000,000,000 for the period 1961-62, comprising largely untied loan facilities. In the case of France, which has made substantial contributions in the past, more money is to be made available, particularly in Africa, where France is associating with her former Colonies. Much French aid passes through Government agencies, unlike the practice in the United Kingdom and the United States, which attempt to make the greatest use of funds provided from private sources.

While the Monroe doctrine in its application to South America may be considered to be dead politically, it has yet sufficient life to stir the US conscience over the plight of the Latin-American communities. According to the President, money is not simply to be poured into the states associated in the Inter-American Development Bank, but funds are to be made available to secure *inter alia* social and educational reforms. Heavy industrial plant may establish an industry, but it may achieve little in improving the lot of the local population. This, many will regard, is the lesson of Iraq of several years ago. Standards must be raised generally, and a bid is being made, even at this late hour, to that end.

It is noticeable in the figures provided by the OEEC report that of the $14,000,000,000 provided by the USA (1956-9), over $5,000,000,000 was provided by private capital: comparable figures for the United Kingdom are $3,100,000,000 and $2,000,000,000, and for Western Germany $2,300,000,000 and $1,100,000,000. The leading democracies are in the habit of making the greatest use of private funds, and every effort should be made to stimulate their flow. This has to some extent been frustrated by fear of expropriation. Developments in Indonesia, Cuba, and Ceylon are perhaps the most recent examples of countries

which have required foreign capital, but have nevertheless not been prepared to grant the foreign investor the security to which he is entitled. It would appear, however, that the general approach of the new states is changing. Nigeria and Tanganyika have welcomed private capital, and India has proposed a more lenient interpretation of the regulations to assist oversea capital. Certain fiscal reforms in India are also calculated to give encouragement to oversea investors who are prepared to participate in the development of the subcontinent. Nevertheless, the fact remains that a code of guarantees to secure private investment is essential. This could be arranged by bilateral conventions negotiated between Governments, or take the form of insurance guarantees upon the payment of an annual premium much along the lines of the systems obtaining in both the US and Western Germany. No such machinery as yet exists in the UK, which is surprising considering the magnitude of British private investment abroad. It is perhaps correct to say that a great deal of thought has been given to the subject by a Parliamentary group, and doubtless within the foreseeable future plans will be evolved much along the lines of those existing in several of the leading countries abroad.

Another matter that is considered to demand the highest priority is commodity price stabilization to ensure that the under-developed primary producing nations receive a relatively even and equitable remuneration for their products, undisturbed by the violent fluctuations which have been characteristic of the pre-war and, to a somewhat lesser extent, of the post-war economies. These swings in commodity prices cut the value of aid and, accompanied by rises in prices for imported equipment from abroad, make it very difficult for developing states to ensure adequate growth along with rapidly expanding indigenous populations. In certain territories, such devices as multiple exchange rates, export duties, and marketing boards have been used to assist local governments to iron out these difficulties, but these are scarcely enough. On an international plane, attempts have been made to work out schemes which are broadly acceptable to a large grouping of nations. These include the international sugar, wheat, and tin arrangements, and it is hoped that more of these schemes will come into operation in later years. There is already talk in EEC territories that a fund will be provided to compensate primary producing territories associated with the Common Market against broad movements in commodity markets. It should be recognized that the industrial states of the western world bear some responsibility to their associates abroad. If they will continue to trade even in times of economic recession, then commodity prices will be maintained, but if they decide that large purchases are to cease then the cyclic developments which have occurred in recent years will recur to the detriment of the countries abroad, many of which are dependent upon one or two agricultural products.

Shortly after the war, many appreciated that Communism would have to be met in the industrial states of the free world. Now it is recognized that the centre of the contest has moved to Asia, Africa, and South America. For capitalism to prevail, it will have to show that its system is broadly more acceptable to the newer countries than that of the centrally planned economies of the eastern world. There is no doubt that the free world has accepted the challenge.

# NCB MAKES OPERATING PROFIT OF £20,200,000

OPERATING profit of the National Coal Board for the year 1960 was £20,200,000 (£13,176,000 in 1959). After deducting £41,200,000 of interest payable to the Ministry of Power and £300,000 of other interest, less income from investments, there was a deficiency for the year of £21,300,000.

The board's report and accounts published today (Friday) reveal that its collieries made an operating profit, before charging interest, of £15,600,000, or 1s. 8d. a ton. Average cost of production was 84s. 5d. a ton, 2s. a ton more than in 1959. Much of this increase was attributable to carrying fixed costs (such as depreciation) on a smaller output and to increases in expenses such as insurance and local rates.

Open-cast operating profits, before charging interest, were £2,300,000, against £3,900,000 in 1959. The operating loss on coke ovens, before charging interest, was reduced from 9s. 10d. in 1959 to 4s. 7d.

Non-operational expenditure came to £70,300,000, compared with £70,900,000 in 1959. Capital expenditure amounted to £85,700,000, compared with £112,000,000 in 1959.

The report states that the board's main objectives last year were to bring coal production below the level of demand, without any substantial measure of hardship to the mining community, and to secure a satisfactory increase in efficiency. These objectives were achieved. Consumption exceeded production by nearly 9,000,000 tons, and stocks held by the board fell by 6,500,000 tons. Despite distribution difficulties during the winter, consumers were, in general, kept regularly supplied, and the quality of the coal sent out was better and more consistent than in previous years.

A fuller summary of the report and accounts will appear in next week's IRON AND COAL.

WELLINGTON TUBE HOLDINGS, LIMITED—The financial year is to be changed to December 31 and dividends totalling 27½ per cent. are forecast for the 18 months to December 31, 1961—equal to 18¼ per cent. per annum (17½ per cent. paid for previous year). It is the directors' intention to pay a second interim of 12½ per cent. in November and, subject to unforeseen circumstances, a final of 10 per cent. for the period.

# Opening of Spencer Steelworks

## *STEEL ERECTION RATE IS "GREATEST ANXIETY"*

PRODUCTION at the Spencer Works of Richard Thomas & Baldwins, Limited, is expected to begin next April. Hopes of the company that it might have been possible to start production before the end of this year were confounded by "dreadful weather—a wet summer last year and a still wetter autumn and winter which doubled our difficulties," said Mr. H. F. Spencer, managing director, on Friday last. He told a Press conference in Newport: "The factor causing the greatest anxiety at the moment is the rate of steel erection at the steelmaking plant itself, but we hope this will be accelerated soon."

Referring to the denationalization of the company, Mr. Spencer said: "Although I am the managing director of the company, I am truthful when I say that I do not know any more than what was contained in the Minister's statement to the House on June 27, 1960, to the effect that it was the firm intention and indeed the confident hope that the work of the Iron and Steel Holding and Realization Agency would be substantially complete before the next General Election. This was confirmed by the Chancellor of the Exchequer on October 27, 1960, and again, on March 23, 1961, when the Economic Secretary to the Treasury stated that the Government expected to see denationalization substantially completed during the lifetime of this Parliament.

MR. H. F. SPENCER

"I cannot give you any more information on that point for the simple and straightforward reason that I do not know, and any guess of your own would be as good as mine."

### Financing the Project

Mr. Spencer emphasized that the Government was not giving the company any money or subsidy to build the plant at Llanwern. The money was being borrowed at a commercial rate of interest and it would have to be paid back in a reasonable time.

He said that the Spencer Works would be part of the company's overall effort. It would be closely integrated with activities at Ebbw Vale. The site at Ebbw Vale limited the amount of iron and steel that could be made and rolled there. Its capacity for steelmaking was about 900,000 ingot tons per year and the hot-strip mill could roll just over 1,000,000 tons a year. This limited production was allocated between light plate, hot-rolled sheets, silicon coil for the company's Midland section, hot-rolled coils for re-rollers, cold-reduced sheets, and cold-reduced tinplate.

"Our proportion of the sheet and tinplate trade therefore was and is totally unrepresentative of the position we once held in the industry and by the restriction of site at Ebbw Vale we have been prevented from improving our position and sharing in the increasing demand." Mr. Spencer said the new works would correct that. At the present time it was intended that Ebbw Vale would produce all the RTB tinplate because they were not yet installing a tinplate cold-reduction mill at Llanwern. They would also expect to increase their rolling of special steels at Ebbw Vale as well as maintain their production of steel sheets.

The new works at Llanwern was not competitive with the Dyffryn and Gowerton works in West Wales, which were rollers of billets, and the continuation of these works depended upon the demand for bars and small sections. The company's other steelworks in West Wales, at Pontardawe, made ingots only, and by the nature of things its life must be somewhat uncertain. It was only in a period of demand far exceeding supply that the transfer of ingots from one works to another was possible.

Mr. Spencer explained that he could not commit himself to an estimate of the final cost of the plant. The most severe financial control was being exercized over expenditure. "I am confident that any comparable plant could not be built by anyone at a less cost than we shall complete this plant," he added. In the first stage of operations it was likely that about 5,500 would be employed at Llanwern; there would be a considerable recruitment from outside the area.

## *Iron and Steel Board Appointments*

SIR CYRIL MUSGRAVE has been re-appointed chairman of the Iron and Steel Board by the Minister of Power. Sir Cyril, formerly Permanent Secretary to the Ministry of Supply, who has been a full-time chairman of the board since March, 1959, will be on a part-time basis from July 1 next. Sir Lincoln Evans, former general secretary of the Iron and Steel Trades Federation, has been re-appointd deputy chairman and Mr. A. G. Stewart a part-time member. Mr. Stewart is chairman and general managing director of Stewarts and Lloyds, Limited.

Mr. N. C. Macdiarmid, managing director of Staveley Industries, Limited, has been appointed a part-time member in place of Mr. Arnold E. Pearce, whose appointment expired on Wednesday.

AFTER 52 YEARS in the mining industry, Mr. A. E. Nicklin, progress engineer at Florence Colliery, Longton (Staffs), has retired.

# Rapidity of Change in Mining Technology

THE mining industry was undergoing the most rapid technological change in its history, and one that matched if not exceeded in its rate that in any other industry today, said Mr. R. F. Lansdown, director of the National Coal Board Central Engineering Establishment at Stanhope Bretby, Burton-on-Trent, on Tuesday.

MR. R. F. LANSDOWN

Welcoming visitors to an Open Day at the Establishment in connection with Commonwealth Technical Training Week, Mr. Lansdown said that the problems which this technological change brought in its train in the requirements of technical staff was considerable, and the mining industry was in urgent need of recruits to learn the skills on which the future of the industry depended. He explained that the basic job of the establishment was developing, testing and producing prototype machinery from ideas. "Our objective is to reduce the cost and take the gruelling work out of mining coal, and we are already well on the way to paying for ourselves many times over."

As development became more complex, demanded more advanced technology, and became more expensive, the work of the Establishment would increase even further in importance in relation to that of the mining manufacturing industry. "We are very conscious that the coal industry's future prosperity depends on our ability and our sense of urgency," he said.

Inaugurating Commonwealth Technical Training Week in Cardiff on Monday, Dr. Idris Jones, Director General of Research, National Coal Board, urged Welsh industries to make a more direct contribution to producing skilled technicians through apprenticeship-training schemes. The present extent of such training was inadequate, he said. "Wales lags somewhat behind the rest of Britain, even though some well-known Welsh companies and the nationalized industries are doing a wonderful job in this connection."

At a dinner given by the County Technical College, Worksop, on Monday, to mark the start of CTTW, Mr. E. W. Lane, general manager of the No. 1 (Worksop) Area, North-Eastern Divisional Coal Board, said that of 3,500,000 people in the three Ridings of Yorkshire, nearly 1,000,000 were dependent on coal mining. In his own Area, comprising 10 collieries, there were more than 1,000 vacancies, including over 170 for craftsmen and technicians. In mining there were wonderful opportunities for training, he said.

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Prof. DONALD ESME INNES, Professor of Geology at the University of St. Andrews from 1936 to 1954 and Emeritus Professor of Geology since 1955, died on Sunday, aged 72. He went to St. Andrews in 1920 as a lecturer in geology, and was appointed Reader in 1926.

# *Passing Thoughts . . .*

IN place of the payroll tax—which would discourage an extension of training schemes—all firms which employ skilled workers should pay a levy into a central fund. They should then be paid back a sum from the fund according to the amount of approved training they carry. The net result would be that the firm which does its fair share of training would break even; the firm which does more than its share would get a subsidy; and there would be a really punitive tax on the firm which relies on "poaching" skilled workers who are trained elsewhere.—MR. R. PRENTICE, MP, in a letter to The Guardian.

> *There are many enlightened industrial firms that do give comprehensive training. Others can do little or nothing because they are too small or too specialized, or are invincibly indifferent to the problem. . . . The real need will not be met until the training of industrial skill is made part of our national educational system.—Daily Herald.*

My interest in the improvement of the present educational system stems from the belief that the greatest need today is for managers and that this need is going to become progressively greater. . . . Up to the present day the great majority of managers have acquired knowledge of the basic principles of management by experience. In the future it will be necessary to teach these basic principles so that the time required to absorb this knowledge can be very much reduced, although experience will still be needed to convert a theoretically trained mind into a practical one.—Mr. ALICK S. DICK, chairman and managing director of Standard Triumph International, Limited, in his Wakefield Memorial Lecture to the College of Aeronautical and Automobile Engineering.

> *Marketing is (or can be!) a science, whereas selling is an art. As to whether both can be done by the same man is surely a matter of individual ability.—Letter in the Financial Times.*

On the doorstep of almost every steelworks in the country lie supplies of peat totalling an estimated 5,000,000,000 tons. It is now possible through the invention of a world-famous chemical engineer and geologist to produce from this peat a high-grade smelting fuel (pure carbon of top quality) for nothing. —Letter in the Yorkshire Post.

> *We cannot hope for the benefits of automation to be spread through lower prices while large-scale industry remains in private hands.—MR. F. HOLLINGSWORTH, chairman of the Amalgamated Union of Foundry Workers.*

The Steel Company of Wales has started something bigger than it knew. Its application to import a little American coal may be—should be—the signal for the beginning of a new realism in British fuel policy.—MAURICE GREEN writing in the Daily Telegraph.

> *Sometimes when I look at the mass of letters I get from MPs and others, I wonder whether it would not be a better idea to colour the merchants instead of the coal.—MR. ALFRED ROBENS, chairman of the National Coal Board.*

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STONE-PLATT INDUSTRIES, LIMITED—During 1960 a profit recovery was experienced and, with a final of 11½ per cent., the dividend is effectively increased to 16 (15) per cent. Group pre-tax profit for the year at £2,409,826 (£2,106,536) shows an increase of just over 14 per cent. on the 1959 figure.

# "HARSH QUOTAS"

## Small Mines Licensees' Criticisms

THERE may have been some justification for a regulation of supplies from licensees in bulk, but no justification whatever for increasing royalties—in some cases sixfold. The imposition of quotas retrospectively was extremely harsh, and to some of our members at least, it appeared to be vindictive. These criticisms were made by Mr. J. Wainwright in his annual report as chairman of the Federation of Small Mines of Great Britain. The fourteenth annual meeting of the federation was held on Tuesday.

Mr. Wainwright maintained that the federation had always affirmed that it was within the power of the NCB to limit the overall production of licensed coal supplies by its policy of granting or withholding licences, as the position warranted. "Never should the individual licensee be restricted from making his pit as productive as possible," he said. "He is already restricted in manpower by the terms of his licence and to restrict further his operations by quotas is economic nonsense."

The restriction of licensees' disposals had inevitably resulted in the loss to the industry of several hundreds of specialized workers, very few of whom would go to NCB pits.

### Cut Out Quotas

The NCB was crying out for more labour, there was a threat of imported US coal, and sanctions were being given for new open-cast sites. "Surely it would be prudent to cut out quotas and encourage licensees to produce as much coal as possible," Mr. Wainwright contended.

The permitted disposals from licensees in 1960 was 2,200,000 tons, a reduction of 410,000 tons compared with the previous year. The actual reduction was rather more. Except in South Wales where a considerable number ceased operations, most licensees were able to carry on. There were fears of a further reduction of 400,000 tons in 1961 but the NCB granted the same quota, and, in fact, intimated that special extra allocations above the operative quota might be given in individual cases.

Licensed mines were both self-supporting and profitable to the board and the Treasury. With the necessary encouragement they could produce 5,000,000 tons a year, thereby paying the board the tidy sum of £1,000,000. It should be the federation's aim to do everything in its power to persuade the board to eliminate quotas for good and all.

Mr. Wainwright was re-elected chairman with Mr. A. Pemberton deputy chairman and Mr. T. M. Broadie-Griffith, secretary. In recognition of his services as chairman of the federation since its inception, Mr. Pemberton made a presentation to Mr. Wainwright.

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TEN MORE 1,850 h.p. diesel locomotives are to be supplied by the English Electric Company, Limited, to the Sudan Railways. Deliveries will start at the end of the year. The company supplied the Sudan Railways in 1959 with 15 of the locomotives valued at about £1,500,000.

## Durham NCB Chief's Tribute to Mr. Sam Watson

TRIBUTE to the services given to the coal industry by Mr. Sam Watson, general secretary of the Durham Area of the National Union of Mineworkers, was paid by Dr. William Reid, chairman of Durham Divisional Coal Board, at the official opening of the Sam Watson Rest Home, Bolton Crofts, Richmond (Yorks) last Saturday. The home, which was formerly opened by Mrs. Sam Watson, is being established by the Coal Industry Social Welfare Organization and will be administered by trustees and a management committee consisting of equal representation of the unions and the Durham Division of the NCB. It will accommodate 20 guests who will stay for a period of two weeks, and is open to wives of NCB employees and female NCB staff in the Durham Division.

Dr. Reid said Mr. Watson had served the Durham miner with unrivalled wisdom and energy, and undoubted success. "No one who shares in the management of the National Coal Board is ever in any doubt where he stands in negotiation. His hard bargaining on behalf of the Durham miner is to him the very zest of living. . . . At the same time he has clearly recognized the value of good industrial relations to our industry, and the status of the Durham division and the Durham miner have gained considerably by his breadth of vision."

Dr. Reid said that Sam Watson's life work had epitomized the highest traditions of the coal mining industry, and when it came to giving the home a name associated with the Durham miner, it had been decided, despite his protestations, to call it the Sam Watson Rest Home.

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## SIR JAMES BOWMAN ON NEED FOR NEW INDUSTRIES

TOO much reliance should not be placed on coal mining in the North-east as a source of employment, and new industries were needed, said Sir James Bowman, former chairman of the National Coal Board, at Ashington on Saturday. He was opening the Northumberland Trades and Careers Exhibition in the County Technical College.

Sir James said it was encouraging to learn that in Northumberland this year 900 school leavers would be recruited into mining, and 250 of them would be selected for apprenticeships. The contraction of the coal industry, however, was a warning of the need for greater diversity of opportunities for youth, he said.

*Personal*

# Mr. J. A. Wright President of Midlands NACM

PRODUCTION manager in the No. 4 Area, East Midlands Divisional Coal Board, Mr. J. A. WRIGHT has been appointed president of the Midland branch of the National Association of Colliery Managers. Educated at Nottingham University, he started his mining career in 1932 and, after training and gaining the necessary experience in general mining work, Mr. Wright became an underground official with James Oakes & Company (Riddings Collieries), Limited, Jacksdale (Nottinghamshire).

MR. J. A. WRIGHT

In 1947 he was appointed assistant manager at Cotes Park and South Normanton Collieries, East Midlands NCB, and later became manager at Cotes Park Colliery. Subsequently he held posts as manager at Teversal, Sutton-in-Ashfield, and Kirkby-in-Ashfield Collieries. He was group manager for the No. 1 group of collieries and deputy Area production manager (operation) in the No. 4 Area before being appointed to his present post in June last year.

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Mr. A. M. PRATT, managing director, and Mr. L. KLEIN, general sales manager, Air Pumps, Limited, London, S.W.20, are in Moscow attending the British Trade Fair.

Managing director of Procter Bros. (Wire Works), Limited, Leeds, Mr. C. W. R. PROCTER, has been elected vice-president of the National Hardware Alliance, Limited.

General manager of the Doncaster (Yorks) factory of British Ropes, Limited, Mr. H. H. EGGINTON has been appointed a member of the Yorkshire Electricity Consultative Council.

Deputy chairman of the Pressed Steel Company, Limited, Mr. M. A. H. BELHOUSE is the first chairman of the Business Aircraft Users' Association, of which there are 39 member firms.

Steelworker at Park Gate Iron & Steel Company, Limited, Rotherham, Cllr. T. SWANCOTT, has been elected vice-chairman of Rotherham Rural Council.

Clerk at the Burnley offices of the North-Western Divisional Coal Board, Cllr. KENNETH BROADLEY (30), is the new chairman of Padiham (Lancs) Urban Council. He is the youngest to hold the office.

Managing director of the British Anthracite Company, Limited, Mr. PHILLIP HOLDEN has been re-elected chairman of the National Council of Coal Traders. Mr. W. C. RAMSAY has been re-elected vice-chairman.

Mr. H. G. SHIELDS, a director of E. Chalmers & Company, Limited, non-ferrous scrap metal merchants, etc., of Leith, Edinburgh, has been elected president of the National Association of Non-Ferrous Metal Merchants' Golfing Society.

Mr. JOHN EVANS, chief clerk in the production and planning department of the hot sheet finishing and galvanising section at the Ebbw Vale (Mon) works of Richard Thomas & Baldwins, Limited, has been elected chairman of Ebbw Vale Urban Council.

Mr. A. T. GRISENTHWAITE, technical department manager with the Power-Gas Corporation, Limited, a member of the Davy-Ashmore, Limited, group, is to retire after 44 years' service. He spent most of his working career with the Stockton firm.

Vice-chairman of Production Engineering Holdings, Limited, management consultants, Mr. J. P. MARTIN-BATES has been appointed principal of the Administrative Staff College, Henley-on-Thames. He succeeds Sir Noel Hall, who has been appointed principal of Brasenose, Oxford.

Brig. A. LEVESLEY, a director of Edgar Allen & Company, Limited, tool steel manufacturers, etc., of Sheffield, who was recently elected senior vice-president of the Sheffield Chamber of Commerce, attended the International Chamber of Commerce Congress in Copenhagen last week.

Mr. SAM BULLOUGH, Yorkshire Area president of the National Union of Mineworkers, officially opened Hickleton Main miners' welfare scheme athletic track at Thurnscoe on Saturday before the start of the divisional NCB championships. A complete new track has been laid which is one of the most up-to-date in South Yorkshire.

Mr. J. T. EVERY, who has been elected president of the South Staffs branch of the National Association of Colliery Managers, has been manager at Birch Coppice Colliery (Warwickshire) since 1957. Prior to 1957 he was undermanager at Coventry Colliery, where he served his apprenticeship. He has also been undermanager at Newdigate Colliery.

Mr. H. G. Brown, director of Firth-Derihon Stampings, Limited; Mr. W. E. A. REDFEARN, deputy managing director of English Steel Forge & Engineering Corporation, Limited; Mr. D. B. RUSSELL, managing director of Thos. Smith & Sons of Saltley, Limited; and Mr. J. SHAKESPEARE, director of Joseph Shakespeare & Company, Limited, have been elected to the council of the Drop Forging Research Association.

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# New President of Birmingham Chamber of Commerce

ONE of the chief architects of the new Diploma of Technology, which has given engineering apprentices the chance to gain qualification at university degree level, Mr. J. J. Gracie was on Monday elected president of Birmingham Chamber of Commerce for 1961-62. Mr. Gracie, who is 62, retired in the New Year as director and general manager of the Witton works of the General Electric Company, Limited, and is now special representative in Birmingham for a firm of merchant bankers. A vice-president of the management board of the Birmingham and District Engineering Employers' Association, and founder-member of the British Institute of Management, he succeeds Mr. P. Middlemas, a director of the Birmingham Railway Carriage & Wagon Company, Limited.

Mr. William E. Kenrick, managing director of Archibald Kenrick & Sons, Limited, ironfounders, a former president of the National Institute of Hardware and of the National Hardware Alliance, was elected senior vice-president, and Mr. L. Hargreaves Beare, deputy chairman and managing director of Needle Industries, Limited, precision engineers, was made junior vice-president. He is also a member of the Grand Council and Midland Regional Council of the Federation of British Industries.

# *Outlook for GKN*

## CHAIRMAN ON GROWING OVERSEA COMPETITION

ALTHOUGH the record profits of last year by Guest, Keen & Nettlefolds, Limited, manufacturers of steel and engineering products, are not expected to be matched this year, conditions now appear to be on a slightly improving level compared with the earlier part of the year, states Mr. K. S. Peacock, chairman. Apart from the question of the volume of business, there is increasing difficulty in maintaining profit margins due to substantially increased costs, he says.

The chairman says that taking the long term view, it will be difficult in the present decade to maintain the rate of growth achieved in the 10 years to 1960. "Our sales in the home market and as exports from the United Kingdom will be subject to strong competitive influences from the Common Market countries and elsewhere, notably Japan."

Most of the group's products, he reminds, do not go direct to the consumer but to the works of customers who embody them in their products. Consequently turnover and profit margins do not depend only upon Guest Keen's efforts and efficiency, but quite largely on the success of its customers in maintaining their trade and profit margins in the face of ever-increasing world competition.

### Need to Reduce Costs

"Our considered policy to meet this situation is to reduce costs wherever possible, which usually involves capital expenditure, often in very large amounts, and to expand along two broad lines. We must step up output of those products where required by expanding demand from our customers, and we must continually seek to broaden our range of products, which is already wide," says the chairman.

In a reference to the Restrictive Trade Practices Act, Mr. Peacock says that the fact that three associations had been successful before the Restricted Practices Court should not obscure the fact that the Act remained a bad one. More than 1,100 associations had been disbanded as a result of the operation of Section 21, but he was still hopeful that the Government would review this Section and make reasonable amendments to its narrow terms in the interests of the manufacturer as well as the consumer.

Mr. Peacock says that as exporters, and particularly as indirect exporters, the exclusion of the UK from the large and prosperous market represented by the European Economic Community must be regarded "as an impediment to the long-term growth of the industries which we serve," and it was earnestly hoped that efforts to bring about some reconciliation between the Community and the EFTA countries would have a speedy and successful result.

For the first time, turnover exceeded £250,000,000 in 1960, representing a rise of £31,000,000 over the previous year. The greater volume enabled the group overall to improve slightly on the rate of profit to turnover of 12 per cent. achieved in 1959 and resulted in a £5,000,000 increase in the trading surplus to a new record of £31,600,000. It is pointed out, however, that the high rate of activity was mainly in the first nine months.

Mr. Peacock says that last year's decrease in capital expenditure to slightly below the expected level of £18,000,000 was accounted for by the expansion schemes at the three steelworks being temporarily slowed down to permit various alterations and additions in plans arising out of important technical developments taking place rapidly in the steel industry. These alterations and additions, together with increases in the costs of construction, made it likely that the total cost of about £20,000,000 to be spent on major schemes in the steelworks over the five years to 1964 may well total some £28,000,000.

In addition to outstanding commitments of £26,000,000, there is about £16,000,000 out of the overall total of £28,000,000 for the steelworks which had not received the approval of the Iron and Steel Board at the year-end.

## Plans by Arthur Balfour for Expansion

PLANS and projects for further expansion and re-equipment by Arthur Balfour & Company, Limited, Sheffield, tool steel manufacturers, are in an advanced study stage, some of which may come to decision soon, states Lord Riverdale, chairman, in his annual report. The cost, he says, will not fall heavily on the 1961 period. Financing is expected to be from the company's own resources, which "envisages opening new horizons of output and range of products."

Turnover in the first four months of 1961 exceeded that of the same period in 1960, says the chairman. There had been talk of a recession in the first two months of the year, but the general tone in the consumer industries, which are customers of the group, was now relatively favourable. A record turnover was achieved last November, and while it was unlikely that those results would be exceeded, "with good fortune we should closely approach or hold the same level."

Referring to higher costs, the chairman warns that despite all efforts to mitigate their effect they must represent a threat to reasonable profit margins which would become rapidly more serious if the scale of output were to be reduced. "If we are to maintain our volume of business, particularly from oversea, we are unlikely to recover much of these increases by adjustment in selling prices."

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ROLLS-ROYCE, LIMITED—Proposed debenture issue will raise a gross sum of £11,880,000. The issue will be of £12,000,000 6½ per cent. debenture stock, 1981-86, at £99 per cent. It will be offered to holders of the company's debenture stock, ordinary stock, and Workers' (1955) stock. The offer will be open for acceptance until June 14.

*Orders Placed*

# SCOW Wins Contract at Moscow Fair

RUSSIA is to buy 10,000 tons of sheet steel from the Steel Company of Wales, Limited, for use by the Soviet motor industry, a spokesman for the company announced at the British Trade Fair in Moscow. The value of the order was not disclosed, but Mr. H. A. Arnold, sales promotion manager of SCOW, said: "We consider this to be a quite substantial order."

The order is the first steel sale of the Fair, and, it is understood, will be mainly used for lorries. Steel Company of Wales is taking part in the British Iron and Steel Federation display.

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CONTRACT WORTH £450,000 has been secured at the British Trade Fair in Moscow by Enfield Rolling Mills, Limited, for the supply of unwrought copper for the Soviet Rasnoexport Company. Deliveries over a six months' period will start later this summer.

ORDERS FROM West Germany to the value of £1,500,000 have been received by Loewy Engineering Company, Limited, Bournemouth, for three extrusion presses for the production of tubes and profiles. The presses will be supplied with "Loewy-Magnethermic" induction billet heaters.

DETAILS ARE being completed for a £40,000 order which Colt Ventilation, Limited, Surbiton (Surrey), has received from the Rumanian Government. The order calls for Colt's standard unit-ventilation equipment which will be installed in a new radiator and bath factory in Rumania.

ELECTRICAL EQUIPMENT worth more than £250,000 for a Soviet tissue-paper-making plant is to be supplied by Associated Electrical Industries, Limited. AEI is sub-contractor to the Charles Walmsley (Bury), Limited, group, and will supply electrical power and controls for 465-in. tissue paper machines.

AN ORDER HAS been received by W. H. Allen, Sons & Company, Limited, mechanical, hydraulic and electrical engineers, of Bedford, from the Hulett Group of Companies, South Africa, for a 3,000-kW condensing turbo-alternator which will provide power for one of their sugar factories on the Triangle Sugar Estate, Rhodesia.

CHEMICAL PLANT ordered from the Power-Gas Corporation, Limited, Stockton-on-Tees, part of the Davy-Ashmore, Limited, group, by Werkspoor, NV of Amsterdam, will be installed in a Russian factory. Power-Gas has also received an order to supply the Southern Gas Board with a Wiggins dry seal gasholder with a capacity of 900,000 cu. ft.

TONNAGE OXYGEN PLANT with a capacity of 125 tons a day is to be built for Shelton Iron & Steel Company, Limited, Stoke-on-Trent, a subsidiary of John Summers, Limited, by Air Products, Limited, the US-owned industrial gases company. The plant forms an important part of the £18,000,000 development programme now being undertaken at the Shelton works.

LARGEST SINGLE order so far at the British Trade Fair in Moscow is the £4,000,000 contract which Vickers-Armstrongs (Engineers), Limited, has negotiated with Techmashimport, the Russian buying agency, for a complete plant to produce industrial nylon yarn and tyre cord. The factory will be built jointly by Vickers-Armstrongs and its German subsidiary Hans Zimmer, of Frankfurt, who are responsible for the chemical engineering of the project.

# *Strike at John Summers is Called Off*

THREATENED strike of maintenance men at the Shotton, near Chester, plant of John Summers & Sons, Limited, which produces a third of Britain's sheet steel output, was called off on Wednesday less than an hour before it was due to begin. The company immediately cancelled its plans to close most of the plant. A meeting of about 800 of the 1,400 workers voted in favour of remaining at work, provided that a committee of investigation into the dispute was established within 21 days. The company accepted this proposal.

The company said on Monday that the management had told maintenance men in one of the sheet-finishing departments who had refused for some days to work on productive machinery that they would be suspended for seven days from Wednesday or until they were willing to carry out their normal duties without sanctions. The craft unions concerned then informed the management that in consequence they proposed to withdraw all labour from the plant from Wednesday.

The company is a substantial supplier to the car and building industries. Production capacity at Shotton is about 2,000,000 tons a year.

The Velindre tinplate works, Swansea, of the Steel Company of Wales, Limited, which had been closed since last Friday by the company because of restrictive practices by the men, re-opened on Tuesday. Members of the Amalgamated Engineering Union and the Electrical Trades Union gave undertakings to the company to stop the practices.

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## Newton Chambers Boiler Wins Design Centre Award

CERTIFICATE of the Design Centre Award made by the Council of Industrial Design for the Redfyre Centramatic 35 oil-fired boiler was presented by the Duke of Edinburgh last week to Mr. P. J. Bovill, managing director of Newton, Chambers & Company, Limited, Thorncliffe, Sheffield. The award was one of 13 made for products selected from more than 3,000 Design Centre exhibits during 1960.

Mr. Michael A. Hetherington, design and development engineer for Redfyre products, and Mr. Brian Asquith, consultant industrial designer, who collaborated in the design and production of the Centramatic 35, were presented to the Duke when he inspected the winning products.

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## ICI SHARE EXCHANGE OFFER FOR SETTLE LIMES

SHARE exchange offer worth £1,250,000 has been made by Imperial Chemical Industries, Limited, to the board of Settle Limes, Limited, quarry owners and lime burners, of Settle (Yorks). The offer is of one ICI £1 share for every seven Settle Limes 5s. shares. There is £600,000 of Settle Limes ordinary capital in issue. ICI shares stood at 78s. 6d. when the offer was made known.

Mr. Woolley Hart, chairman of Settle Limes, says that the board will consider the approach and will make a further announcement as soon as possible. An ICI spokesman said that the offer turned on ICI's increasing limestone needs.

# *ECSC Coal Sales*

## FALL OF 5,000,000 TONS FORECAST THIS YEAR

SALES of hard coal in the European Coal and Steel Community are expected to reach 245,000,000 metric tons this year—about 5,000,000 tons less than sales in 1960, according to a report published by the inter-executive working party of the ECSC, the European Common Market, and Euratom. The report, which deals with the 1961 energy balance, shows that power consumption in West Germany, France, Italy and the Benelux countries is expected to rise by 16,000,000 hard coal units to 489,000,000 h.c.u. during this year.

This increase represents a rise of only 3.3 per cent. compared with an increase last year of 8.1 per cent., being based on 1961 rises of only 6.5 (12) per cent. in ECSC-area industrial production and of 4.7 (7) per cent. in gross social production. The share of coal in the total of energy consumed will stand at 50 per cent., compared with 53 per cent. in 1960. Of the total 489,000,000 h.c.u., some 216,000,000 h.c.u. will be consumed in West Germany alone.

Apart from the 50 per cent. of total power consumption in ECSC accounted for by hard coal, the share of brown coal will fall from 7.6 per cent. to 7.4 per cent. It is expected that the iron and steel industry will use 1 per cent. less coal, the specific consumption per metric ton of crude steel falling during the year to an ECSC average of 893 (924) kg. In household consumption, coal usage over the year is expected to fall from 33,120,000 tons to 32,800,000 tons, and that of coke from 14,500,000 tons to 13,400,000 tons.

Production capacity of hard coal is expected to fall during the year from 240,000,000 tons to 230,000,000 tons, which will include a drop in West German capacity from 142,270,000 tons to 140,000,000 tons. While the number of underground workers is expected to fall by a further 10 per cent., a rise in productivity per man shift to over 2 tons is forecast. Coal imports from outside ECSC are expected to rise by 1,100,000 tons to 18,800,000 tons.

## Sahara Gas Plans Ready for Government Approval

AGREEMENT of the details under which natural gas from the Sahara might be supplied to this country was reached in Paris last Friday between the Gas Council, the French producer companies, and Conch International Methane, which will be responsible for shipping. The Gas Council's proposals will now be submitted to the Minister of Power for approval.

According to a recent unofficial estimate, the price, after allowing for the costs of reforming it to town gas values, might be about 8d. a therm. This compares with an average cost of about 1s. a therm at conventional plants in the UK.

## Reducing Coke-making Costs at NCB Plant

SCIENTISTS at the National Coal Board's carbonization and chemical plant at Wingerworth, near Chesterfield, are hoping to reduce the cost of coke production by a new method of purifying effluent before it is discharged into the River Rother. Dr. N. M. Potter, the plant's general manager, said last week: "Our aim is to get our costs down to a minimum and pay our way. But under the present set-up, whatever we do is unlikely to make any difference to the price of coke."

Dr. Potter said the present bill for cleaning up the effluent by chemical means was about £400 a day. Including the capital cost of plant this worked out at 4s. per ton of coal carbonized. Under the new process now being developed, it was hoped to reduce this to 6d. a ton. The new method, now being run as a pilot scheme, involves charging the effluent with harmless bacteria which feed on and destroy the toxic and poisonous products of the waste liquid. It can then be discharged into rivers without risk of pollution. The bacteria can be obtained from sewerage sludge or even ordinary soil.

The Wingerworth plant, one of the most modern in the country, is capable of producing 1,500 tons of coke a day for domestic and industrial uses.

## RISE IN UK EXPORTS LAGS BEHIND OTHER COUNTRIES

EXPORTS of manufactured goods from the United Kingdom rose by 6.9 per cent. last year, compared with an average increase of 15.4 per cent. by the major industrial nations of the West. With the single exception of Canada, the UK's increased share in the world market was smaller than that of any of the 11 countries listed in a survey published last Friday by the Board of Trade.

The total value of British manufactured goods sent abroad, estimated to be $8,403,000,000, was surpassed however only by the value of manufactures exported by the United States ($11,293,000,000) and West Germany ($10,134,000,000). The Board of Trade's survey gives provisional figures for the main manufacturing countries other than the Soviet Union, China, and those in Eastern Europe.

MANUFACTURING ENGINEERS, brassfounders, etc., Baker Perkins, Limited, Peterborough (Northants), has been granted planning permission for extensions to its experimental department.

## *Board Changes*

TANGYES, LIMITED—Mr. E. W. Newman has resigned from the board.

LANE & GIRVAN, LIMITED—Mr. B. W. Payne has been appointed a director.

BOVING & COMPANY, LIMITED—Mr. E. V. Small has joined the board.

NORTH BRITISH LOCOMOTIVE COMPANY, LIMITED—Mr. H. A. Siepmann has resigned from the board.

DARTMOUTH AUTO CASTINGS, LIMITED—Mr. W. H. Batchelor has joined the board as commercial director.

CRITTALL MANUFACTURING COMPANY, LIMITED—Mr. John F. Crittall has been elected chairman and will retain the managing directorship.

MERRYWEATHER & SONS, LIMITED—Mr. Leonard R. Parker, who joined the company in 1925 as an apprentice, has been appointed a director.

CONSOLIDATED PNEUMATIC TOOL COMPANY, LIMITED—Mr. S. H. Ireland has been appointed assistant managing director, Mr. L. S. Bright, financial director and Mr. A. O. Miller, director.

ENGLISH CLAYS LOVERING POCHIN & COMPANY, LIMITED—Mr. A. N. G. Dalton has been appointed managing director. He was formerly a director and general manager of the company.

WELLMAN SMITH OWEN ENGINEERING CORPORATION, LIMITED—Mr. W. H. Day has been appointed commercial director. He has relinquished his position as secretary of the company and Mr. D. G. Felton has succeeded him in that office.

BIRMINGHAM SMALL ARMS COMPANY, LIMITED—After five years in office Mr. J. Y. Sangster has relinquished the chairmanship at his own request. He will continue as a director. Mr. E. Turner, who joined the company last year as deputy chairman and chief executive, succeeds Mr. Sangster.

UNION CARBIDE, LIMITED—Mr. J. F. Widman, director and general manager, chemicals division, is shortly to retire from the board. He is to take up a new assignment with Union Carbide International. Mr. K. D. Rutter has been appointed marketing manager, chemicals division, of Union Carbide.

CONSOLIDATED PNEUMATIC TOOL COMPANY, LIMITED—Mr. Norman Readman, managing director, has been elected president of the Chicago Pneumatic Tool Company, New York. Mr. Readman who joined Consolidated Pneumatic in 1943 has been responsible for the development of the company throughout the western hemisphere.

ALBRIGHT & WILSON, LIMITED—Mr. F. G. Pentecost has resigned from the board following his retirement from the board of the subsidiary A. Boake Roberts & Company (Holding), Limited. Mr. B. White has been appointed to the board, and Prof. D. M. Newitt, until recently Courtauld Professor of Chemical Engineering, Imperial College of Science and Technology, has been appointed a part-time director.

## ADVANCES IN BOILERMAKING

SPEAKING at Southampton to retired members of the Boilermakers' Society, Mr. John Chalmers, assistant general secretary, said tremendous changes were taking place, particularly regarding automation, and they looked to the younger members to pay some attention to this transformation.

Mr. Chalmers added that not enough was done to meet the needs of members who had reached retirement beyond 65. He considered that in the event of the cost of living rising, retirement pensions should move up correspondingly.

## Allied Ironfounders Expansion

EXPANSION of the activities of Allied Ironfounders, Limited, in the catering equipment industry has been carried a stage further by its setting up a factory at Saxon Works, Broadfields, Sheffield, which will trade in the name Allied Ironfounders (Stainless Steel Products), Limited. This company's activities will embrace not only those at Sheffield but in addition part of the Falkirk Iron Company, Limited, production, to be marketed through Allied Ironfounders' Catering Equipment Division at 18, Dering Street, London, W.1. The factory at Sheffield is to supply high-grade finished stainless steel products. Heavy catering equipment will continue to be manufactured at Falkirk.

The board of Allied Ironfounders (Stainless Steel Products), Limited, is as follows: Mr. R. L. Hunter (chairman), Mr. G.E. Richards, Mr. C. S. Beers, Mr. R. G. Sinclair and Mr. N. T. Radcliffe. Mr. Hunter is managing director of the Northern group and Mr. Richards is managing director of Leisure Kitchen Equipment, Limited; both are directors of Allied Ironfounders, Limited, while Mr. Sinclair, as managing director, and Mr. Radcliffe figure on the board of the Falkirk Iron Company, Limited, and Mr. Beers on that of Leisure. The works manager at Sheffield is Mr. H. R. Flowers.

## *Warning on Slow Intake of Engineering Apprentices*

UNLESS firms increase their intake of apprentices and expand training facilities, British industry will be short of 127,000 skilled workers by 1967, according to estimates given in Birmingham by leaders of the Engineering Industries Association Group Apprenticeship scheme. Mr. A. M. K. Turney, regional engineer of EIGA, as the scheme is called, said the shortage of skilled workers was worsening because firms were not training enough recruits to counter the loss of skilled labour by retirement at the age of 65.

The trend has been steadily worsening since 1956, when 130,000 skilled workers reached retirement age and were replaced by only 96,000 apprentices. In another six years retirements would number 230,000 and at the present rate of recruitment there would be only 103,000 new apprentices.

## Rising Demand for Engineers

ACCORDING to a study of manpower needs and planning in the publication Metalworking Production, the demand for professional engineers and scientists is rising at the rate of about 6 per cent. a year, much faster than industrial poduction. There are vacancies for 10,000 engineers and scientists in British industry, which now employs 195,000. By 1966 it is estimated that there will be employment for between 265,000 and 270,000 in these classes.

To avoid a serious shortage of trained men in the next decade, compared with Germany, Russia and the US, engineering firms will have to plan at least 10 years ahead, the article states. "The hard fact revealed is that the standards of training will have to be raised to meet the demands of a technological age."

# BLAST-FURNACE TRIALS

# *at Pompey, France*

## INJECTION OF LIGHT FUEL OIL

**This is a translation of a report of the High Authority of the European Coal and Steel Community, issued in August, 1960, entitled "Recherches sur l'Injection d'Hydrocarbures dans les Hauts Fourneaux: Essais d'Injection de Fuel Liquide Léger dans le Haut Fourneau No. 3 Pompey Merchant en Minerai Tout Venant."**

IN the introduction to the report, Marc Allard, president of committee, research director, states that the High Authority has participated, by a financial levy, in researches into methods of decreasing the coke rate and increasing the productivity of blast furnaces. Thus, it has contributed to the international blast-furnace trials at Liège which have shown the interest there is in the injection of fuel oil into blast furnaces and indicated the technological background for its use.

In 1958, the High Authority agreed to finance a programme of blast-furnace trials by the Société des Aciéries de Pompey, which very enterprisingly, proposed to restart the researches of M. Dufraine in 1950 and 1952.

The trials reported here were carried out in 1959 and 1960, by M. Hazard, head of the blast-furnace section, under the direction of M. Dhenein, president of the executive committee, and due thanks are made to him and his staff and also to M. J. Cordier, of IRSID, for his support, particularly in regard to the study and analysis of the phenomena observed.

### Historical

Trials on oil injection into the blast furnaces were carried out at Pompey in March, 1950, and again in February, March, and May, 1952, on Nos. 1 and 2 furnaces making ferro-manganese and hematite iron.

The fuel was injected in the liquid state without oxygen enrichment or steam addition by four water-cooled tubes placed 3 ft. above the normal tuyeres.

The trials were suspended because fuel leakage clogged the drains and polluted the Moselle.

In 1956, it was decided to carry out the trials again in a furnace making basic iron (Thomas iron). Three successive trials were planned as follow:—(1) Liquid fuel injected into the hearth of the blast furnace, in accordance with the ideas of M. Dufraine, with an increase in blast temperature; (2) with oxygen-enriched air; (3) injection of reducing gas at 1,400 deg. C., reducing gas obtained by cracking the oil in Shell gasifiers, using steam and oxygen.

The discussion carried out on the financing of the trials by the European Coal and Steel Community (CECA) retarded the programme and it was only in January, 1959, that the first tuyere for fuel injection was introduced into No. 4 blast furnace. The trials were carried out in association with CECA, IRSID, and Shell.

### Preliminary Trials

Commencing on January 11, 1959, the preliminary trials ended on September 5, 1959. They were carried out, as were the trials proper, with an unprepared Lorraine ore burden.

### Mode of Injection

Two modes of injection have given satisfaction as follow:—

(*a*) Special injectors, a kind of thick water-cooled tuyere (Fig. 1) having a total length of 1.45 m. and penetrating 0.8 m. into the interior of the furnace, these injectors being put in place of the bosh tuyeres. They permitted up to 70 kg. of oil to be used per ton of pig (*i.e.*, 200 kg./hr. per injector). Beyond this the blast furnace becomes saturated and oil is lost at the joints. A first injection trial with a 2.25-m. long injector put in place of a normal tuyere ended in a failure, the nose of the injector being worn back by 50 cm. in 10 days, a weld having loosened.

(*b*) Atomizing tubes, based in the tubes used at

NOTE.—This translation does not include the appendices to the report, which consist of voluminous tables giving the daily operating data of the furnace throughout the reference period and the tests.

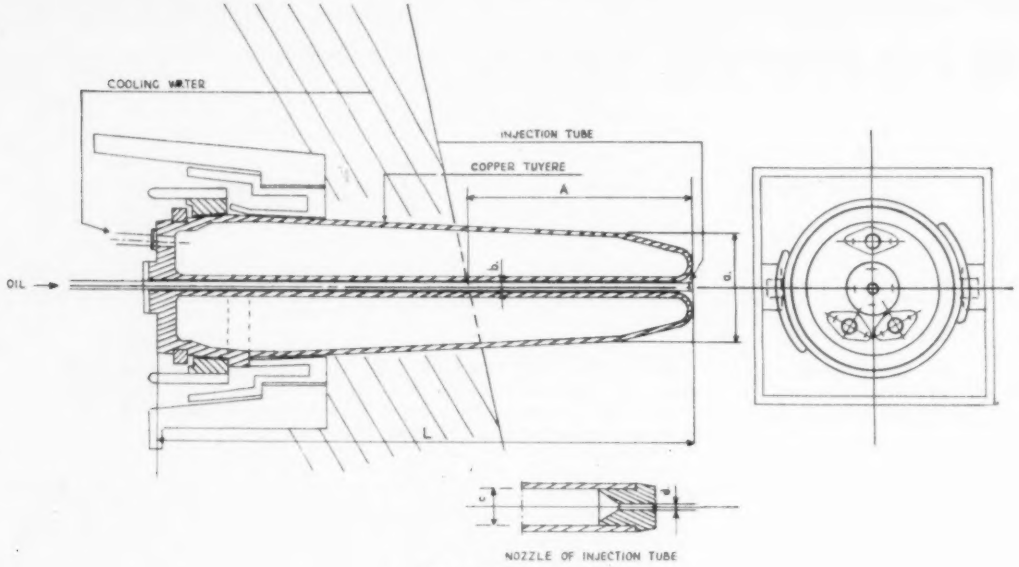


FIG. 1.—INJECTION TUBE.

the Ougree low-shaft furnace, the cooling of the tubes and the atomization of the fuel being carried out by compressed air.

### Description of the Preliminary Trials

Seven preliminary trials allowed the problem of injection of fuel to be investigated. Details are given in Table 1. The variables are as follow:—(*a*) The quantity of fuel to be injected for a 100-deg. C. increase in blast temperature; (*b*) the location of fuel injection: in normal tuyeres or at the bosh; (*c*) the method of injection: with or without atomization; (*d*) the bosh tuyeres: open or closed.

### Results

Each trial period lasted not longer than 10 days, this is too short for any definite conclusions to be drawn. It was noticed in particular how often a variation in the ore quality could falsify the results.

However, it is possible to say that the two most satisfactory periods, Nos. 2 and 7, had a number of points in common. (*a*) For a 100-deg. C. increase in blast temperature the quantity of fuel injected had not exceeded 45 kg./ton pig; (*b*) it seems preferable that the bosh tuyeres should be open; (*c*) an increase in production of around 10 per cent.; (*d*) smooth descent of burden with wind temperature around 900 deg. C.

TABLE 1.—*Preliminary Trials.*

| No. of trial. | Quantity of oil, kg./ton iron. | Location of injection. | Mode of injection. | Bosh tuyeres. |
|---|---|---|---|---|
| 1 | 61.3 | bosh | tube | open |
| 2 | 32.0 | ,, | ,, | ,, |
| 3 | 46.7 | ,, | ,, | ,, |
| 4 | 35.5 | ,, | ,, | closed |
| 5 | 70.0 | normal tuyeres | atomization | ,, |
| 6 | 44.4 | ,, ,, | ,, | ,, |
| 7 | 40.0 | ,, ,, | ,, | open |

### Actual Trials

These trials were carried out on furnace No. 3 (see Table 2).

This report is only concerned with injection trials using oil atomized by compressed air through the normal tuyeres or through bosh tuyeres. The blast was not enriched with oxygen. Figs. 2 and 3 show the installation and a cross-section of the injector. The injection pipe and its protective casing were of stainless steel and the nozzle at the end of the tube was 2 mm. in diameter. The Pompey organization, directed by M. Debruille, carried out the injection installation.

The daily consumption of fuel oil was between 13 and 13.5 tons, which represents an hourly consumption per injector of: 135 to 140 kg. for four injector operation; 67 to 70 kg. for eight injector operation.

The compressed-air pressure was 0.800 kg./cm$^2$ and the flow per tube was 39 m.$^3$/hr. (50.5 kg./hr.). The consumption of air per kg. of fuel oil is then as follows:—

Four injector operation: 0.36 to 0.37 kg. or 0.28 to 0.29 m.$^3$; eight injector operation: 0.72 to 0.74 kg. or 0.56 to 0.58 m.$^3$

### Cooling Effect of Compressed Air

(*a*) *Four Injector Operation:* Total flow of hot blast, 38,000 m.$^3$/hr.; temperature of hot blast,

TABLE 2.—*Actual Trials: Details of Furnace.*

| | | |
|---|---|---|
| 1 | Works | Acieries de Pompey |
| 2 | Location of works | Pompey |
| 3 | Blast-furnace number | 3 |
| 4 | Hearth diameter | 4.80 m. |
| 5 | Diameter between tuyere nozzles | 4.30 m. |
| 6 | ,, of bosh parallel | 6.84 m. |
| 7 | ,, ,, throat | 5.20 m. |
| 7a | ,, ,, | 6.88 m. |
| 8 | ,, ,, bell | 2.30 m. |
| 9 | ,, ,, distributing cone | 3.55 m. |
| 10 | ,, ,, "cigare" | 2.00 m. |
| 11 | Level of tapping hole | 0 m. |
| 12 | ,, ,, slag notch | 1.40 m. |
| 13 | ,, ,, normal tuyeres | 2.30 m. |
| 14 | ,, ,, auxiliary tuyeres | 3.935 m. |
| 15 | ,, ,, top of hearth | 2.80 m. |
| 16 | ,, ,, bosh | 7.60 m. |
| 17 | ,, ,, ,, parallel | 8.64 m. |
| 18 | ,, ,, ,, stack | 20.44 m. |
| 19 | ,, ,, ,, brickwork | 22.60 m. |
| 20 | Stockline level | 24.80 m. |
| 21 | Level of gas off takes | 25.75 m. |
| 22 | ,, ,, throat platform | 27.10 m. |
| 23 | ,, ,, lowered bell | 25.85 m. |
| 24 | Bosh angle | 78 deg. |
| 25 | Angle of stack | 86 deg. 16 sec. |
| 26 | ,, bell | 55 deg. |
| 27 | Volume of hearth | 50.6 m.³ |
| 28 | ,, ,, bosh | 129 m.³ |
| 29 | ,, ,, bosh parallel | 38.2 m.³ |
| 30 | ,, ,, stack | 337.8 m.³ |
| 31 | ,, ,, throat | 45.8 m.³ |
| 32 | Useful volume | 542.8 m.³ |
| 33 | Useful height | 19.5 m. |
| 34 | Number of normal tuyeres | 8 |
| 35 | Diameter of normal tuyeres | 6 × 180 mm., 2 × 150 mm. |
| 36 | Number of auxiliary tuyeres | Eight positions of which four are equipped |
| 37 | Diameter of auxiliary tuyeres | 130 mm. |
| 38 | Number of gas off takes | 2 |
| 39 | Diameter of gas off takes | 1.60 m. |
| 40 | Number of dust catchers | 1 |
| 41 | Number of washers | — |
| 42 | Cleaning | Four Halberg-Beth units |
| 43 | Capacity | 160,000 m.³/hr. (for four units) |
| 44 | Stoves | Three of which two in use |
| 45 | Checker volume | Total wt. of checkers 1,590 tons |
| 46 | Blast temperature | 780 deg. C. |
| 47 | Regulation | Yes |
| 48 | Blowing | Reciprocating gas engines |
| 49 | Blast volume | Mean 38,000 m.³/hr. max. 45,000 m.³/hr. |
| 50 | Blast pressure | From 0.53 to 0.60 kg./cm.² |
| 51 | Charging | Stahler buckets |
| 52 | Bucket capacity | 6 m.³ |
| 53 | Coke per bucket | 3 tons |
| 54 | Size of coke | Greater than 20 mm. |
| 55 | No. of charges per 24 hr. | 86 charges of 3 tons coke |

900 deg. C.; total flow of compressed air, 156 m.³/hr. being 0.4 per cent.; lowering of temperature due to compressed air, 3.6 deg. C.

(*b*) *Eight Injector Operation:* Lowering of temperature due to compressed air: 7.2 deg. C.

### Preliminary Note

It is appropriate to note that injection was only possible because the available stoves permitted an appreciable increase in blast temperature to be made.

*The injection of fuel without a corrective increase in the blast temperature is not of interest* since this will only result in a cooling of the hearth and the corresponding improvements in the coke rate will be of little interest, economically speaking, in relation to the quantity of fuel injected.

It must be underlined, on the other hand, that the results obtained *are only valid for unprepared burden operation.*

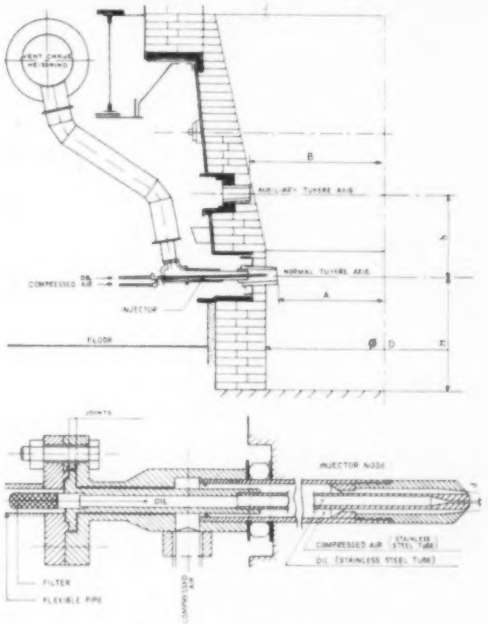


FIG. 2.—ATOMIZING INJECTOR.

### Three Trial Periods and Reference Period

PERIOD A (January 12-February 12, 1960).—Injection in eight normal tuyeres, bosh tuyeres closed.

PERIOD B (February 16-March 11, 1960).—Injection in eight normal tuyeres, two bosh tuyeres being open.

PERIOD C (March 15-April 23, 1960).—Injection in four bosh tuyeres. The eight normal tuyeres not receiving any fuel.

REFERENCE PERIOD.—This was from December 5 to 25, 1959, and the results agree with those of the year 1959 (other than the injection periods).

Apart from some metallic additions (scrap, scale, and furnace slag) to the extent of 120 kg./ton pig, the burden was solely unprepared ore as follows:—

Droitaumont: 0-250 mm., 2,700 kg./ton pig; limey ore of good physical quality 35.8 per cent. Fe.

Saizerais: 0-250 mm., 500 to 700 kg./ton pig; Siliceous ore friable and of poor quality 30.8 per cent. Fe; 100 kg. Kiruna D and $C_2$. The coke was screened, the 0 to 20 being removed. The overall yield of iron from the burden, allowing for a loss of primary flue dust of 200 kg./ton, is 29.5 per cent.

Table 3 gives the chemical and screen analysis of Droitaumont and Saizerais ores and the analyses of the coke and the injected fuel.

Period A was from January 12 to February 12,

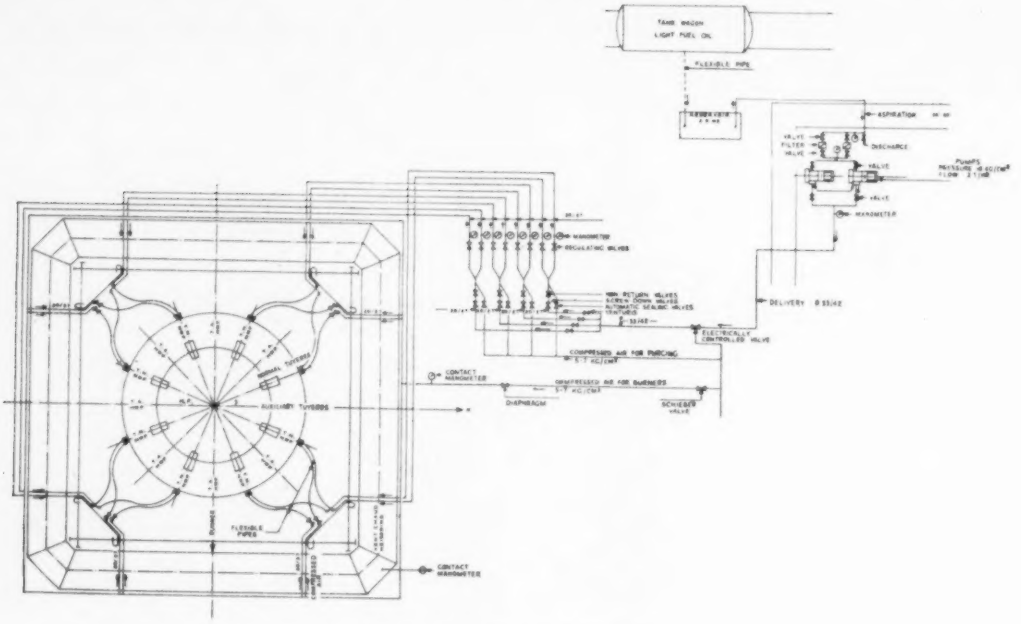

FIG. 3.—OIL INJECTION LAYOUT.

TABLE 3.—*Details of the Ores, Oil, and Coke.*

*Analysis.*

| 1960. | $H_2O$. | Fe. | CaO. | $SiO_2$. | $Al_2O_3$. | MgO. | Mn. | S. | P. | $CO_2$. | LOI. | $CaO/SiO_2$. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Droitaumont:* | | | | | | | | | | | | |
| January .. .. | 11.26 | 35.87 | 12.95 | 7.23 | 4.19 | 1.74 | 0.31 | 0.139 | 0.796 | 13.70 | 20.03 | 1.79 |
| February .. | 11.57 | 35.79 | 13.10 | 7.15 | 4.10 | 1.89 | 0.29 | 0.156 | 0.804 | 14.18 | 19.85 | 1.83 |
| March .. .. | 11.47 | 35.77 | 13.19 | 7.15 | 4.19 | 1.46 | 0.31 | 0.165 | 0.801 | 13.83 | 19.97 | 1.84 |
| *Saizerais:* | | | | | | | | | | | | |
| January .. .. | 10.47 | 30.31 | 12.77 | 14.38 | 4.47 | 1.64 | 0.20 | 0.205 | 0.768 | 13.00 | 20.93 | 0.89 |
| February .. | 11.57 | 30.82 | 13.33 | 13.06 | 4.67 | 1.71 | 0.19 | 0.187 | 0.770 | 12.98 | 19.97 | 1.02 |
| March .. .. | 10.78 | 31.14 | 13.19 | 13.09 | 4.35 | 1.79 | 0.20 | 0.171 | 0.751 | 12.99 | 20.47 | 1.01 |

*Size grading.*

| | | Percentage. | | | |
|---|---|---|---|---|---|
| | | 0-10 mm. | 10-25 mm. | 25-50 mm. | > 50 mm. |
| Droitaumont: | 0-250 mm. .. .. .. | 17.5 | 13.5 | 15 | 54 |
| Saizerais: | 0-250 mm. .. .. .. | 24.0 | 13.5 | 14 | 48.5 |

*Oil.*

| | Engler viscosity at 20 deg. C. | Density. | Percentage. | | | C.V. (gross). | C.V. (net). |
|---|---|---|---|---|---|---|---|
| | | | S. | Water. | Ash. | | |
| No. 1 liquid .. .. .. | 4.79 deg. E. | 0.885 | 1.24 | Nil | Trace | K/cals. 10,598 | K/cals. 9,905 |

*Coke (after screening).*

| | $H_2O$. | Ash. | V.M. | S. | Micum test (percentages). | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | > 40 mm. | 20-40 mm. | 10-20 mm. | 0-10 mm. |
| Drocourt-Aniche: .. .. | 1.97 (1 per cent. on leaving) | 9.10 | 0.44 | 0.89 | 85.20 | 7.29 | 1.20 | 6.31 |

TABLE 4.—*Results of Period "A" Compared with Reference Period.*

| Period. | Units. | Reference. | A. | A1. | A2. |
|---|---|---|---|---|---|
| Date | | December 5-25, 1959. | January 12-February 12, 1960. | January 12-31, 1960. | February 1-12, 1960. |
| Oil rate | Kg./ton | 0 | 51 | 53 | 47 |
| Normal daily production | Ton/day | 258.2 | 271.3 | 281.5 | 256.9 |
| Production per operating hour | Ton/hr. | 10.76 | 11.306 | 11.729 | 10.71 |
| Increase in production | Per cent. | — | 5.07 | 9.01 | −0.5 |
| Saizerais ore rate | Kg./ton | 494 | 720 | 699 | 800 |
| Coke rate (dry screened) | Kg./ton | 1,007.9 | 920.1 | 905.9 | 944.4 |
| Si in iron | Per cent. | 0.60 | 0.59 | 0.60 | 0.58 |
| Blast temperature | Deg. C. | 781 | 869 | 868 | 870 |
| Overall yield | Per cent. | 29.53 | 28.8 | 29.35 | 28.09 |
| Primary flue dust | Kg./ton | 201.7 | 193.9 | 183.7 | 209.7 |
| Net yield | Per cent. | 32.43 | 31.43 | 31.93 | 30.81 |
| Slag index | — | 1.44 | 1.47 | 1.44 | 1.50 |
| Net C.V. of gas | Kcal/m.³* | 916 | 949 | 959 | 934 |
| $H_2$ in gas | Per cent. | 3.74 | 4.43 | 4.57 | 4.25 |
| Temperature of gas | Deg. C. | 111 | 111 | 112 | 116 |

* 950 Kcal/m.³ = 108 B.t.u./c.f.

1960. Oil injection was through eight normal tuyeres; the bosh tuyeres were closed.

It can be seen from Table 3 that both Droitaumont and Saizerais ores became more limey as the trials progressed. This caused the quantity of Saizerais ore to be increased from 500 kg./ton pig in the reference period, to 1,000 kg./ton at the end of the trials, which brought about an important change in the quality of the burden (its size grading and richness)

TABLE 5.—*Operating Costs: Comparison of Period A and Reference Period (Unit Price).*

| Variation. | Unit price. | Plus. | Minus. |
|---|---|---|---|
| + 52 kg. of oil | 0.20 NF | 10.40 NF | |
| +38 kg. of compressed air | 0.76 cent | 0.30 | |
| +157 cal. gas (in stoves) | 1.275 cent | 2.00 | |
| −140 cal. gas produced | 1.275 cent | 1.78 | |
| −102 kg. screened coke | 0.1137 NF | | 11.60 NF |
| Manufacturing costs: | | | |
| Proportional to coke rate (−10 per cent.) | | | 2.60 |
| Proportional to fuel rate (per kg.) | 0.62 cent | 0.32 | |
| Investment prop. to production (9 per cent.) | | | 2.40 |
| Labour (1 man/day extra) | 1,000 NF per month | 0.11 | |
| | | 14.90 | 16.60 |

The importance of this factor was seen in the first month of the trial; while production increases in excess of 10 per cent. were achieved at first, these decreased to around zero when the quantity of Saizerais ore charged (per ton pig) increased to 800 kg.

The average increase in production for the whole of period A, 5 per cent. is thus not valid and the period has been divided into periods A1 and A2 as follows:—A1: January 12 to 31, 669 kg. Saizerais ore/ton pig; A2: February 1 to 12, 800 kg. Saizerais ore/ton pig.

The period A1, when compared to the reference period, gave the results outlined in Table 4.

Injecting 53 kg. oil/ton pig with an increase in blast temperature of 88 deg. C. causes:—(1) 9 per cent. gain in production; (2) a lowering of the dry-screened coke rate of 102 kg. (in spite of the fact that the net iron yield had decreased by ½ per cent.).

Table 5 gives an idea of the overall operating costs of iron production (a decrease of 1.70 NF/ton). This table obviously does not take account of several factors which would also influence, economically speaking, this reduction in the cost of ironmaking, for example:—(1) The very regular operation of the furnace (assured production with no cuts to the steelworks); (2) decrease in the consumption of sodium carbonate (8 kg. to 5 kg./ton); (3) decrease in capital costs, the production being increased. Finally, the utilization of a heavy oil would further lower the costs of ironmaking.

TABLE 6.—*Results of Period A1 and Period B Compared with Reference Period.*

| Period. | Units. | Reference. | A1. | B1. | B2. | B. |
|---|---|---|---|---|---|---|
| Date. | | Dec. 5-25. | Jan. 12-31. | Feb. 16-29. | Mar. 1-11. | Feb. 16-Mar. 11. |
| Oil rate | kg./ton Fe | — | 53 | 43 | 40 | 43 |
| Daily production | ton/day | 258.2 | 281.1 | 282.1 | 304.2 | 292.0 |
| Hourly production | ton/hr. | 10.76 | 11.729 | 11.753 | 12.674 | 12.166 |
| Gain in production | per cent. | — | 9.01 | 9.23 | 17.79 | 13.07 |
| Saizerais ore rate | kg./ton Fe | 494 | 669 | 566 | 425 | 501 |
| Dry, screened coke rate | kg./ton Fe | 1,007.9 | 905.9 | 922.6 | 889.4 | 907.2 |
| Si in iron | per cent. | 0.60 | 0.60 | 0.68 | 0.65 | 0.67 |
| Blast temperature | deg. C. | 781 | 868 | 902 | 904 | 903 |
| Overall yield of burden | per cent. | 29.53 | 29.35 | 28.92 | 29.44 | 29.16 |
| Primary flue dust | kg./ton Fe | 201.7 | 183.7 | 220.6 | 250.6 | 243.5 |
| Net yield of burden | per cent. | 32.43 | 31.93 | 31.98 | 33.10 | 32.49 |
| Corrected coke rate | kg./ton Fe | — | 878.1 | 905.9 | 908 | 908.2 |
| Slag index | | 1.44 | 1.44 | 1.52 | 1.52 | 1.52 |
| Net C.V. gas | kcal/m.³ | 916 | 959 | 947 | 949 | 948 |
| $H_2$ in gas | per cent. | 3.74 | 4.57 | 4.52 | 4.11 | 4.33 |
| Gas temperature | deg. C. | 111 | 112 | 139 | 131 | 136 |

Period B was from February 16 to March 11, 1960. Oil injection was through eight normal tuyeres; two bosh tuyeres were open.

During the course of period A the limit of the blowing capacity was reached (as happened during the reference period). In order that the Saizerais ore rate should not exceed 500 kg./ton, a small quantity of pebbles was added. Period B was divided into two parts:—Period B1, February 16 to 29; period B2, March 1 to 11.

Period B1 corresponded to furnace operation resembling that of A1 (and also that of the reference period). Gain in production, 9.26 per cent.

A corrected coke rate has been introduced into Table 6 (for blast temperature 900 deg. C. net burden yield 32.4 per cent. Si in iron 0.60 per cent.) in order to be able to compare more easily the periods A, B, and C. The corrected coke rate changes from 868 to 906 kg./ton. This increase may perhaps be explained by the fact that two bosh tuyeres were open.

Period B2 corresponded to faster operation; the increase in production rate was 17.8 per cent., but the primary flue dust production increased to 250 kg./ton pig. On the other hand, it should be noted that the corrected coke rate was substantially unchanged (908 kg./ton as against 906). Thus it seemed that the injection of fuel created, in a furnace operating with an unprepared burden, a reserve zone as described by MM. Cordier and Monnaure.

Table 7 gives an idea of the variation in smelting costs for the whole of period B as compared with the reference period.

TABLE 7.—*Operating Cost: Comparison of Period B and Reference Period (Unit Price).*

| Variation. | Unit price. | Plus. | Minus. |
|---|---|---|---|
| +43.4 kg. of oil | 0.20 NF | 8.68 NF | |
| +31 kg. compressed air | 0.76 cent | 0.25 | |
| +255 cal. gas (in stoves) | 1.275 cent | 3.25 | |
| −200 cal. gas produced | 1.275 cent | 2.55 | |
| +23 kg. of iron in flue dust | 8.0 cent | 1.84 | |
| −100 kg. of screened coke | 0.1137 NF | | 11.37 NF |
| Manufacturing costs: | | | |
| Proportional to coke rate (−10 per cent.) | | | 2.60 |
| Proportion to fuel rate | 0.62 cent | 0.26 | |
| Investment prop. to production (+ 13 per cent.) | | | 3.00 |
| Extra labour (1 man/day) | 1,000 NF per month | 0.11 | |
| | | 16.94 NF | 16.97 NF |

Period C was from March 15 to April 23. Oil injection was through four bosh tuyeres, there being no fuel injection through the eight normal tuyeres. The horizontal level at which oil was injected was thus raised by 1.365m.*

Period C, as the two preceding ones, was divided into two periods C1 and C2:—C1, March 15 to March 21; C2, March 22 to April 23.

Period C1 was similar to period B2; the corrected coke rate was higher by 25 kg./ton (933 as against 908) (see Table 8).

It was thus necessary to obtain a similar increase in production (18 per cent.) to increase the operating rate which also gave an increase in the flue dust make. It was thus clear that changing from operation A (injection at the normal tuyeres, bosh tuyeres closed) to operation C (injection through four bosh tuyeres which are open) resulted in an increase in coke rate of 50 kg./ton.

Period C2 corresponds to a furnace operation similar to the reference period. There was a gain in production of 11.6 per cent. and a lowering of the coke rate of 120 kg./ton. (The net burden yield, however, was 1.4 per cent. higher; this was in part due to the increased iron content of the Droitaumont in April: 36 per cent.) The loss of primary flue dust did not return to 200 kg./ton, but remained at 256 kg. The hydrogen content of the top gas was a little higher: 4.5 per cent.

The results of period C were thus not quite so favourable as those of period B.

Finally, one of the four bosh tuyeres was located exactly on the axis of the tapping hole; it was necessary to take the furnace off blast once or twice a week to clear this tuyere which had a tendency to close up. It was also found a little more difficult to maintain a tapping hole of normal length. The top gas temperature measurement failed during period C; thus there are no values in Table 8. The temperature stayed at around 130 deg. C. during this period.

* NOTE.—Table 2 suggests that this should be 1.635 m.

TABLE 8.—*Results of Period B2 and C Compared with Reference Period.*

| Period. | Units. | Reference. | B2. | C1. | C2. | C. |
|---|---|---|---|---|---|---|
| Date. | | Dec. 5–25. | March 1–11. | March 15–21. | Mar. 22–Apr. 22. | Mar 15–Apr. 22. |
| Oil rate | kg./ton Fe | — | 40 | 44.2 | 49.1 | 48.2 |
| Daily production | ton/day | 258.2 | 304.2 | 304.9 | 288.24 | 291.29 |
| Hourly production | ton/hr. | 10.76 | 12.674 | 12.704 | 12.010 | 12.137 |
| Gain in production | per cent. | — | 17.79 | 18.07 | 11.62 | 12.80 |
| Saizerais ore rate | kg./ton Fe | 494 | 425 | 524 | 525 | 525 |
| Dry-screened coke rate | kg./ton Fe | 1007.9 | 889.4 | 908.9 | 884.7 | 889.3 |
| Si in iron | per cent. | 0.60 | 0.65 | 0.56 | 0.65 | 0.63 |
| Blast temperature | deg. C. | 781 | 904 | 897 | 913 | 910 |
| Overall yield of burden | per cent. | 29.53 | 29.44 | 29.47 | 29.91 | 29.83 |
| Primary flue dust | kg./ton Fe | 201.7 | 250.6 | 252.1 | 256.9 | 256.0 |
| Net yield of burden | per cent. | 32.43 | 33.10 | 33.16 | 33.81 | 33.68 |
| Corrected coke rate | kg./ton Fe | — | 908 | 933 | 927 | 928 |
| Slag index | — | 1.44 | 1.52 | 1.45 | 1.47 | 1.46 |
| Net C.V. gas | Kcal/m.³ | 916 | 949 | 946 | 939 | 940 |
| $H_2$ in gas | per cent. | 3.74 | 4.11 | 4.13 | 4.54 | 4.46 |
| Gas temperature | deg. C. | 111 | 131 | — | — | — |

TABLE 9.—*Iron Temperature (deg. C.).*

| Slag index. | Without oil. | | | | | | With oil. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.30 1.39 | | 1.40 1.49 | | 1.50 1.59 | | 1.30 1.39 | | 1.40 1.49 | | 1.50 1.59 | |
| Si. | No. | | No. | | No. | | No. | | No. | | No. | |
| 0.25–0.34 | 4 | 1,366 | 6 | 1,360 | 1 | 1,400 | 1 | 1,390 | 8 | 1,383 | 1 | 1,380 |
| 0.35–0.44 | 2 | 1,370 | 8 | 1,376 | 4 | 1,376 | 4 | 1,379 | 11 | 1,389 | 1 | 1,383 |
| 0.45–0.54 | 11 | 1,372 | 12 | 1,374 | 2 | 1,385 | 8 | 1,405 | 19 | 1,400 | 18 | 1,390 |
| 0.55–0.64 | 1 | 1,410 | 11 | 1,388 | 1 | 1,435 | 5 | 1,408 | 19 | 1,415 | 17 | 1,397 |
| 0.65–0.74 | 2 | 1,365 | 6 | 1,393 | 1 | 1,360 | 2 | 1,402 | 21 | 1,405 | 12 | 1,404 |
| 0.75–0.84 | 2 | 1,385 | 13 | 1,401 | 3 | 1,392 | 3 | 1,395 | 7 | 1,406 | 10 | 1,398 |
| 0.85–0.94 | | | 3 | 1,405 | | | | | 7 | 1,411 | 4 | 1,415 |

## Iron Quality

The injection of 45 kg. oil/ton pig through the normal tuyeres (periods A and B) accompanied by an increase of blast temperature of 85 to 125 deg. C. greatly influenced iron quality.

(1) *Temperature of the Iron.*—This temperature, taken by immersion pyrometer in the metal stream, towards the centre of the runner, showed an increase in iron temperature of 20 to 30 deg. C. for the same silicon in the iron and the same slag basicity index (Table 9).

(2) *Sulphur.*—In the same way the sulphur content of the iron was relatively low (for unprepared burden operation). (Table 10.)

It was evident that for a given silicon in the iron, oil injection made it possible to lower the slag basicity from 1.5 to 1.3 without increasing the sulphur content of the pig. The iron quality during period C was a little poorer than in periods A and B, wall build up, followed by melting down of these scaffolds, occurring. The increase in metal temperature, as compared with the reference period, was 15 deg. C. on average. The average sulphur content of the metal was 0.040 for 0.63 per cent. silicon in metal and a slag of basicity 1.46.

The sulphur contents of the slags were as follow:—Reference period, 1.36 per cent.; period A1, 1.35 per cent.; period B, 1.27 per cent.; period C, 1.18 per cent., and the particular ratios $\frac{(S)}{[S]}$ and values of K.Si.S were:—

| | $\frac{(S)}{[S]}$ | K.Si.S. |
|---|---|---|
| Reference | 23.05 | 18 |
| A | 40.85 | 31 |
| B | 42.33 | 35 |
| C | 28.30 | 22 |

## Incidents During Operation

Several injection tubes became blocked during operation with eight injectors. This did not upset the operation of the furnace as the injectors were designed so that they could be changed during operation. This trouble was caused by the fact that there were only four oil lines, two injectors being fed from each line.

If one of the injectors received a lesser flow of oil, *e.g.*, as a result of a blockage of its own individual filter, the oil heated up in this tube while the other carried most of the fuel. This phenomenon was self-aggravating, the injector rapidly becoming blocked while the other carried all the oil. To prevent these incidents it is necessary to regulate the flow of oil to each injector. The most economic system would appear to be one using a volumetric pump.

From the indicated data, the cost for the overall installation at Pompey was 78,500 N.F. A correct installation for eight tuyeres would require 100,000 N.F.

As for the furnace operation, it was very satisfactory, with regular burden descent and with iron and slag always very fluid. It was no longer necessary to check the furnace as hanging no longer took place.

It should be noted that an oil stoppage of 10 or 12 hr. can be tolerated without alarm. The iron remains hot and the furnace will continue to accept blast at 900 deg. C. without hanging.

## Minimum Flow per Injector

With the injectors used, which were 2 m. long, it was found that trouble ensued if the oil flow fell below 60 kg./hr., with blast at 870 deg. C. (period A) and below 80 kg./hr., with blast at 920 deg. C. (periods B and C).

TABLE 10.—*Percentage Sulphur Content of Metal.*

| Slag index. | Without oil. | | | | | | With oil. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1.30 1.39 | | 1.40 1.49 | | 1.50 1.59 | | 1.30 1.39 | | 1.40 1.49 | | 1.50 1.59 | |
| Si. | No. | | No. | | No. | | No. | | No. | | No. | |
| 0.25–0.34 | 5 | 0.074 | 13 | 0.087 | 3 | 0.081 | 3 | 0.043 | 10 | 0.051 | 4 | 0.061 |
| 0.35–0.44 | 3 | 0.079 | 24 | 0.065 | 8 | 0.058 | 5 | 0.047 | 15 | 0.044 | 9 | 0.037 |
| 0.45–0.54 | 13 | 0.068 | 28 | 0.056 | 5 | 0.049 | 11 | 0.037 | 27 | 0.033 | 24 | 0.037 |
| 0.55–0.64 | 1 | 0.055 | 30 | 0.053 | 3 | 0.057 | 8 | 0.032 | 34 | 0.025 | 28 | 0.028 |
| 0.65–0.74 | 2 | 0.056 | 17 | 0.057 | 9 | 0.044 | 3 | 0.034 | 30 | 0.032 | 20 | 0.029 |
| 0.75–0.84 | 3 | | 17 | 0.044 | 4 | 0.034 | 5 | 0.031 | 14 | 0.031 | 16 | 0.027 |
| 0.85–0.94 | | | 5 | 0.050 | | | | | 6 | 0.032 | 9 | 0.020 |

**Nature of Final Operation**

In May, 1960, an operating practice was adopted which has given entire satisfaction.

Four injectors in four normal tuyeres are considered to be adequate and two bosh tuyeres are kept open. This permits a very flexible operation without any troubles due to variations in burden quality. A 10 per cent. increase in production and a 10 per cent. decrease in coke rate, with blast at 900 deg. C. and 45 kg. of oil injected per ton of iron, has been obtained.

**Conclusions**

With a blast furnace working with an unprepared burden and having stoves allowing an extra 100 deg. C. blast temperature to be obtained, the injection of 45 to 50 kg. of oil per ton of iron will enable an increase in production of 9 per cent. and a lowering of the coke rate by more than 100 kg./ton to be achieved.

When two bosh tuyeres are opened, if the blowers are at the limit of their capacity, it is possible to increase production by 18 per cent. without an excessive increase in coke rate or flue dust loss (the latter is 255 kg./ton as against 200).

From the point of view of smelting costs, operation at a constant coke burning rate lowers the cost of iron by 1.70 N.F./ton. Faster driving giving a production increase of 13 per cent. does not change the smelting cost.

As regards iron quality, an increase of 25 deg. C., on average, of the iron temperature is found and this permits, with unprepared burden iron of the desired quality to be made with a slag basicity of 1.30.

# *Development of Mallory 53*

DEVELOPMENT of Mallory 53, a nickel-silicon-copper alloy that fulfils the need for a spring material with mechanical properties at least equal to those of the conventional phosphor bronzes and brasses, but with appreciably higher electrical conductivity, is announced by Johnson, Matthey & Company, Limited, 73-83, Hatton Garden, London, E.C.1. The need for a spring material with such characteristics has been felt for some time by designers of electrical equipment, especially those involved in the production of miniaturized components.

Because of the exceptionally high electrical conductivity of the alloy, 40-45 per cent. I.A.C.S., it is possible for springs of small section to carry appreciably larger currents when made in Mallory 53 alloy than when made in phosphor bronze. Advantage can be taken of this characteristic to increase the current rating of existing designs of springs. All spring forming operations can be applied to Mallory 53 after heat treatment and hence the alloy is supplied in the precipitation hardened conditions requiring no further heat treatment by the user.

A data sheet, 1300:332, giving details of the characteristics of the alloy and the forms in which it is supplied, is available.

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SANDERS & FORSTER, LIMITED, of Barking (Essex) and Stratford, London, E.15, the standard steel building and structural engineering company of the Chamberlain group of companies, has extended its range of standard steel-framed buildings to include a new structure known as the "S. & F." arched roof building.

## *Sign of the Times*

ONE of the 24 roll housings of the new hot-strip mill for the Spencer Works of Richard Thomas & Baldwins, Limited, photographed at an appropriate point in its journey to Newport from the works in Sheffield of the mill builders, the Davy & United Engineering Company, Limited.

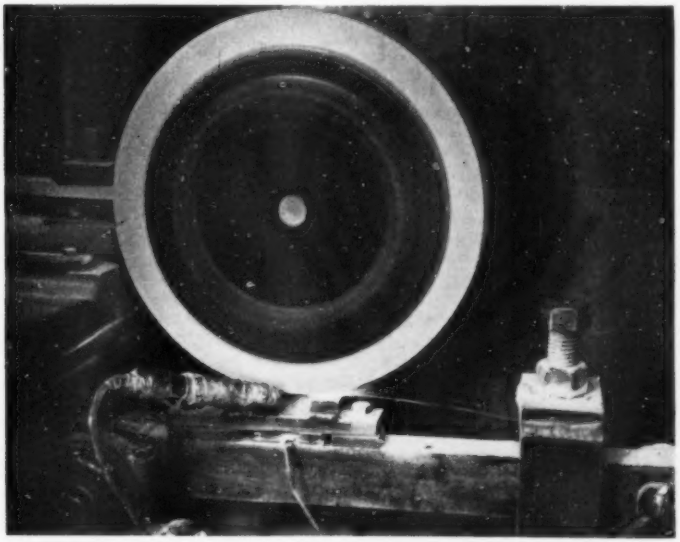
Most of these mill housings weigh about 125 tons each and are being transported from Sheffield to Newport over a circuitous route totalling 270 miles as compared with the normal road distance of 180 miles.

**A notable feature of next week's conference of the National Association of Colliery Managers in Edinburgh will be an exhibition devoted to safety in mines research and application staged by the Safety in Mines Research Establishment of the Ministry of Power in co-operation with the safety and research organization of the National Coal Board in a variety of mutually supporting displays.**

# SAFETY IN MINES RESEARCH AND PRACTICE

## SMRE and NCB Exhibition for Colliery Managers' Conference at Edinburgh

THIS will be the largest exhibition of its kind so far presented, and this is particularly fitting in view of the fact that the chosen theme of the conference is "Progress—with Safety," and that attendance at the conference will be the highest ever. The exhibition will be seen by a considerable number of those responsible in the ultimate for safety in the coal mines of Great Britain.



ONE OF THE FORMS OF APPARATUS USED BY SMRE TO INVESTIGATE FRICTIONAL IGNITION OF METHANE. A STEEL SLIDER IS PRESSED AGAINST A ROTATING ROCK WHEEL. THE HIGH TEMPERATURES PRODUCED WILL IGNITE METHANE.

The numerous exhibits are designed to illustrate the major hazards encountered in the mines of today, to show some of the ways in which research seeks means of removing these hazards or minimizing their results, and to demonstrate methods by which this knowledge may be applied in practice.

The exhibition will be open to members of the conference at times specified in the conference programme or by special arrangement during the currency of the conference and on Friday of next week. Arrangements have also been made for visits by parties from the coalfields, notably safety officers. Most of the material has been designed for safe and easy transport, and it is intended that much of it will be used in selected displays in the coalfields.

In addition to its immediate value as a means of advancing knowledge of safety and research in mines, the exhibition will be of special interest as exemplifying effective ways in which visual instruction may be used in the form of diagrams, films, photographs, models, and the like for educational purposes.

### Stone-dust Barriers

A highlight of the Safety in Mines Research Establishment exhibit will be the display devoted to stone-dust barriers. This precaution against coal-dust explosions is of topical interest,

THIS SHOWS A DEMONSTRATION OF THE SMRE METHANOMETER IN AN EXHIBITION STAND AS IT WILL BE SHOWN AT EDINBURGH NEXT WEEK. THE TIP OF THE PROBE (A MODIFIED DEPUTY'S STICK) IS SAMPLING METHANE IN A "CAVITY" INCORPORATED IN THE STAND.

since the use of stone-dust barriers was recently made compulsory in certain mine roadways. Visitors will be able to examine correctly constructed barrier shelves of an officially approved type, installed in a short length of "mine roadway" which will be constructed in the exhibition hall. The specimen shelves will include one shelf carrying no dust, so that its construction can be examined, and one carrying the waterproofed stone dust which is recommended for use in conditions of high humidity.

The firedamp hazard will be vividly illustrated by a model based on a mine explosion. The model represents a roadhead, with a cavity; a falling stone brings a trail of methane down from the cavity into the roadway, where it is ignited, and flame spreads up this trail to the main body of methane in the cavity. The SMRE methanometer, which has now received official approval as a firedamp detector and is being manufactured, will be shown detecting methane in a "cavity" built into the exhibition stand.

Another display will show work on frictional ignition of firedamp. Twelve of the 24 firedamp ignitions in 1960 were caused by coal-cutter picks striking rocks in the undercut. The display emphasizes the danger of cutting in hard quartzitic rock; this type of rock, specimens of which are included in the display, blunts coal-cutter picks rapidly, and blunt picks increase the danger of firedamp ignitions. The danger of cutting into pyritic inclusions is also emphasized. Another important point is that good roof support is one way of reducing the hazard of frictional ignitions, since, as the model previously illustrates, methane may be brought down from roof cavities by falls of roof and ignited by frictional impact between falling rock and steel equipment.

As the centre-piece of this display, a film strip of laboratory experiments will be run continuously through an automatic projector; and a film of some of the experiments will be shown. Several different forms of apparatus are used to produce, under controlled conditions, impacts or continuous rubbing between various materials.

It appears that when one excludes chemical reactions, only materials with high melting-points can be made hot enough by friction to ignite firedamp; materials with sufficiently high melting-points include the steel in tools and quartz in rock. In addition, when a light alloy and an oxide such as rust are brought together and heated by friction (for example, by a blow), the chemical reaction is usually vigorous enough to ignite methane. Another chemical reaction is the oxidation of pyrites, which may occur when the pyrites are powdered and heated by friction; this reaction may ignite firedamp. In all these instances of frictional ignition, whether firedamp is ignited or not depends very much on the kind of blow, or the arrangement of parts that rub together.

### "Intrinsic Safety" Testing

Other aspects of safety in firedamp will be illustrated by displays that show the research and stringent testing on which intrinsic safety certification and flameproof certification are based. Visitors will see a film of the internal explosion test which forms part of the testing of flameproof equipment. An exhibit will be devoted to the SMRE 12-shot exploder, and some basic research into flameproof protection will also be illustrated.

SMRE's foam-plug method of fighting mine fires, which has already been used on at least one mine fire in America, will be illustrated. Teams are being trained in the use of the foam-plug method both in Britain and abroad.

Examples of the work of SMRE's metallurgists and mechanical engineers will include the SMRE twin-web roof bar. A display will explain some of the considerations underlying the design of these bars, which have proved themselves in arduous conditions underground, and are now being manufactured in large quantities.

One of the techniques used in the design of this roof bar was "stress analyis"; SMRE is pioneering the application of stress analyis to mining equipment. A display will show how this technique is applied to part of a detaching hook, as used in drum-winder systems. The display includes a

small "photo-elastic bench"; visitors will see the patterns of coloured bands set up in a model of a detaching hook when it is loaded. From these patterns it is possible to deduce the distribution of stresses in the full-scale component. These studies have enabled suggestions to be made concerning the design of detaching hooks.

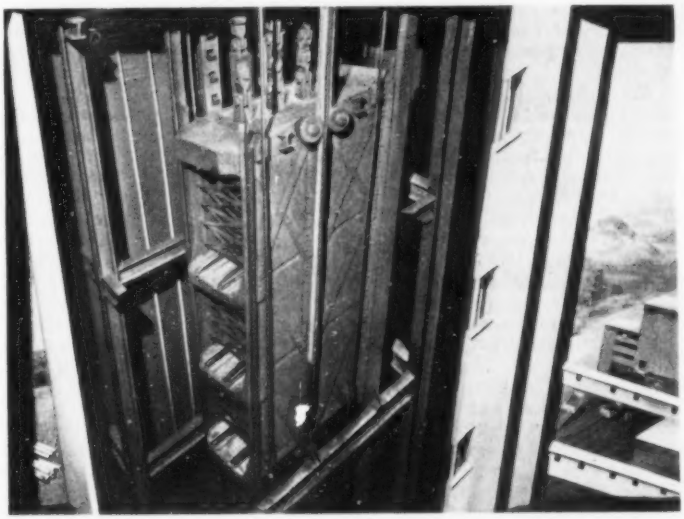
Another display shows a device for the safe arresting of overwound cages. The new cage arrester uses aluminium honeycomb, which has high compressive strength and remarkably consistent load-yield characteristics.

The idea is that strips of this material could be bonded to guide rails in the headframe, and, where applicable, in the shaft bottom. In the event of an overwind, the honeycomb would be crushed between pairs of rollers mounted on the cage, and the braking effect would bring the cage safely to rest. It is expected that the device would be used mainly with friction winders; it might also be used to arrest the descending cage in drum-winder installations. So far, tests have been carried out only a fairly large laboratory scale, but it is hoped that full-scale tests will be arranged in the near future. This device was more fully described in IRON AND COAL dated October 14, 1960 (p. 845).

A display on wire ropes shows some of the most common causes of failure, and the best methods of avoiding failure.

### "Strain-ageing" in Metal

Another display illustrates the metallurgy of iron and steel for mining equipment. Investigations of aircraft crashes (and for many readers, Nevil Shute's novel, "No Highway") have drawn public attention to the fact that the structure and behaviour of metals may alter as a result of repeated stresses, changes in temperature, etc., and that sudden failure may be the result. This problem is as important in mining as in the aircraft industry; for example, if components of haulage, cage-suspension, or roof-support equipment break suddenly and without warning, fatal accidents may result. One possible source of failure is strain-ageing; certain irons and steels, after being strained by the impacts, overloading, etc., that are more or less inevitable in mining service, will become excessively hard and brittle with the passage of time, and will be dangerously prone to failure. By choosing materials that are not liable to embrittlement by strain-ageing in the conditions of mining service, it is possible to reduce the risk of sudden failure. The display also deals with the problem of defective welds in wrought-iron chain links.



THE SAFETY IN MINES RESEARCH ESTABLISHMENT'S NEW CAGE ARRESTER. A FULL DESCRIPTION OF THIS DEVICE, TOGETHER WITH A DIAGRAM, APPEARED IN OUR ISSUE OF OCTOBER 14, 1960 (P. 845).

### NCB Displays

The material shown by the National Coal Board has been drawn from various divisions and from the Central Engineering Establishment at Bretby.

The centre-piece exhibit at the entrance to the exhibition is designed to give the impression of a tidy surface, and will have on show the Durham divisional shield for the senior class of pit.

Elsewhere, attention is drawn to the hazards of contraband below ground, and to the problem of making an adequate search. On show will be a typical mirror used on colliery surfaces to remind men of their duty to search themselves. Various aspects of the safety officer's work are shown, including a planned maintenance scheme which originated in the North-Eastern Division, and typical photographs of safety officers at work in various divisions.

Exhibits on safety campaigning deal with consultation for safety, a typical organization for a safety campaign, poster competitions, examples of "Safety Weeks" from the North-Western Division, and items for special attention forming part of the Durham campaign. Safety trophies on display will include the J. N. Williamson trophy of the Scottish Division, and examples of awards from the United States, including one of the bronze "Sentinels of Safety" trophies, specially flown over for this exhibition.

### After-effects of Injuries

The after-effects of injuries are noted in respect of falls of ground accidents, and the exhibit includes the main industrial diseases (excluding pneumoconiosis), and eye injuries.

There is a comprehensive display of safety hel-

mets, a wide range of hand protection, knee protection, and other items, and an example of a safety catalogue now being prepared in the Durham Division.

Since many accidents are due to lifting, handling, stumbling, or falling, information is given about correct and incorrect ways of lifting and handling, together with posters drawing attention to the need for tidiness, to avoid such injuries. Typical types of safety harness now in use, and suitable for different conditions, are shown.

Attention is drawn to the means which can be taken to meet the requirements of Section 70 of the Mines and Quarries Act, either by pretreatment of timber by impregnation, or *in situ* treatment by spraying underground. The wide experience of the East Midlands Division in this matter has been drawn upon.

In dealing with conveyor fires, examples are shown of various conveyor installations in a number of divisions, which provide the minimum opportunity for dust to settle and become ignited. Also on show is an actual smoke detecting apparatus, linked with a schematic comprehensive conveyor protection system being tried in the Durham Division.

**Roadhead Supports**

The latest developments in roadhead supports are featured both in photographs and models showing the Bretby Mark IIIA canopy and arch setter, the Durham "triangular" support system, Bretby and Durham forepoling brackets, the triple web roadhead bar, and various stilts.

Recent developments in devices suitable for withdrawing supports in thin seams are shown, together with some equipment, the misuse of which has led to serious and fatal accidents.

Emphasis is placed in an exhibit on the problems of providing support with certain types of power loader when men have to work in the prop-free-front area.

Developments in kerf ventilation are demonstrated with particular reference to the two main types, employing in once case both compressed air and water, and in the other water only while a dust-suppression exhibit deals in particular with the CEE redesigned water jib, the CEE dust suppression drum, and the Joy-Sullivan-Peake ripping machine.

The problems of the prop-free-front face are referred to again and various means for stopping the armoured conveyor in an emergency are described. Some recent developments in control systems, employing radio signals, are illustrated.

Another exhibit on coal blasting and alternatives is mainly concerned with the use of water ampoules and water stemming. It also illustrates the use of air breakers and the Dawson Miller stable hole machine, the purpose of which is to eliminate shotfiring in the roadhead area.

In connection with shotfiring in rippings, attention is drawn to the foam injection method initiated in the North-Eastern Division. The proper use of shotfiring shelters and the use of prepared stemming are also shown. Attention is drawn to the high incidence of haulage accidents in the spacious roadways now provided underground.

Two examples are shown on the types of circumstances which account for the majority of electrical accidents, and examples of proper test plugs for use with gate-end boxes are demonstrated.

Special emphasis is laid on the problems of methane layering, the principles of methane drainage, and the problems of auxiliary ventilation. Linked with this are shown the developments made recently in the conversion of certain flame safety lamps to take in samples fed from thin layers or high places through a suitable gas testing probe.

The work done at the NCB's Central Engineering Establishment in respect to the testing of materials is demonstrated in relation to various forms of roof support, and the method used to test non-metal materials, such as fabrics, belting, hose, ducting, etc.

In spite of the improvements in mine safety, comparison against other industries, particularly when compared with colliery surface work, still shows the mining industry in an unfavourable position. Figures are given for comparison, in terms of man-hours per accident.

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# *Slip-ring Motors*

NEW range of slip-ring motors is announced by Crompton Parkinson, Limited, London, W.C.2. They are now available in a limited range:—(1) As continuous maximum rating with drip-proof enclosure up to 10 h.p. 4-pole speed, suitable for applications where the use of squirrel-cage motors is not practicable and for operation on 3-phase 50 cycles; (2) as KRN class, suitable for use with cranes and lifts, ½ hr. or 1 hr. rated up to 15 h.p. 4-pole speed, with drip-proof or totally enclosed endshields. Both types of motor can be wound for voltages between 100 and 600 V. Larger frame sizes are in production carrying the range up to 30 h.p. and 40 h.p.

All motors comply with BS 2613:1957 for performance and have fixing dimensions and shaft sizes as those standardized in BS 2960:Part 1:1958 for the frame size used. The horsepower assigned to these frames is one step lower than the equivalent squirrel-cage machine listed in BS 2960.

Other features of their construction are the inclusion of internal slip rings which give facilities for double-shaft extension machines and Class E insulation which is permitted to have a 65 deg. C. temperature rise. The rings and brushes are continuously rated and special attention has been paid to the design of these machines to allow easier accessibility to slip-ring and brush-gear assemblies for maintenance purposes.

It is intended to complete the range of motors of this class by developing flanged and skirt-mounted machines which will also follow BS dimensions.

# MAWCO CUTTER LOADER *at Littleton Colliery*

## Application with Powered Roof Supports

*by* **J. V. CUMBERBATCH***

*Reviewing the attempts at mechanization of coal-getting in the steep measures of the Brooch Seam at Littleton Colliery, this paper compares hand-filling results with the shearer loader and the Mawco cutter loader. After several unsuccessful attempts at mechanization in this seam, the Mawco cutter loader was successfully applied in conjunction with Seaman Gullick self-advancing roof supports. The paper was presented to the South Staffordshire Branch of the National Association of Colliery Managers on March 23, 1961.*

THE Brooch Seam at Littleton Colliery in the Cannock Chase Area of the West Midlands Divisional Coal Board measures 49 in. thick and consists of bright-banded coal throughout with hard bands in the bottom half of the seam. It contains little mineral impurity apart from a small amount of pyrites, which occur in thin plates. The roof is a soft carbonaceous mudstone and it is therefore necessary to leave 4 to 6 in. of coal roof. The floor is a strong carbonaceous clay. Fig. 1 shows a section of the Brooch Seam. The average ash content is less than 3½ per cent. and the seam is a high-volatile type producing a good domestic grade of coal.

The seam lies at a depth of 227 yd. and the coal has not a well-defined cleat but is generally 45 deg. to the full dip of 1 in 2½. The seam has been worked with variable success over the years at Littleton Colliery. For the most part conventional mining has been applied to the seam due to the difficulty of finding a suitable machine to work on steep gradients. On hand-filled faces the coal is middle cut some 26 in. from the floor and 45 in. of coal is extracted. The coal is loaded onto 12-in. Cowlishaw & Walker retarder conveyors. Packs and wastes are 5 yd. wide. The o.m.s. per filler is approximately 10½ tons saleable, the face o.m.s. being about 75 cwt. saleable. Lately, however, using steel chock bases and releases with a fully caved system, the face o.m.s. has improved to 85 cwt.

The first experiment to mechanize this seam in 1957 was with an AB trepanner in conjunction with Seaman Gullick hydraulic chocks. This machine was not found successful due to the gradient being too steep and also the inability to control the machine on the seam horizon, which varied in

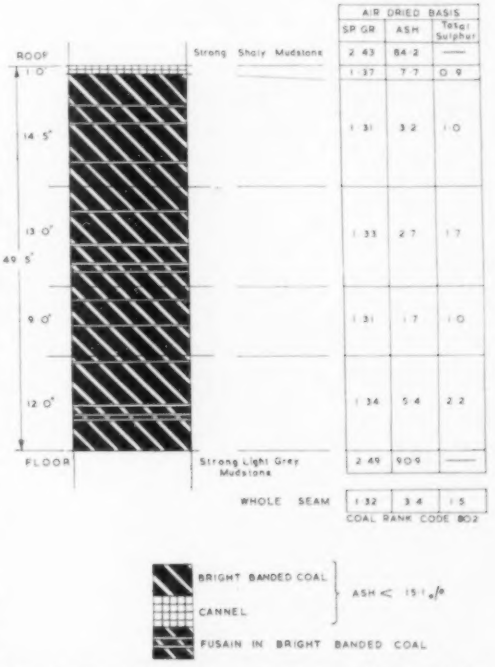



FIG. 1.—SECTION AND ANALYSIS OF THE BROOCH SEAM.

* Group manager, No. 4 Group, Cannock Chase Area, West Midlands Divisional Coal Board.

gradient from 1 in 2.4 to 1 in 6 at the loader gate. A shearer was installed in the Brooch Seam for a period which gave an overall o.m.s. of up to 7 tons per man, but, due to the demand for large coal, the face was reverted to hand-filling methods.

At the end of 1959 it was decided to install an Aubauhobel with a complete installation of Gullick hydraulic chocks at 208s north-east Brooch face, which was 210 yd. long (Fig. 2). After several weeks of trials it was realized that the bottom section of the seam was too hard for ploughing and a shearer was installed temporarily while awaiting the delivery of a Mawco cutter loader. This was installed on June 19, 1960, for trials, but did not start regular production until August, 1960, partly due to the intervention of the annual holidays. The Mawco miner was designed by Mr. J. Mawson, of No. 1 Area, East Midlands Division, to produce a product which was comparable with that from hand-filled faces and also to use the existing shearer machines, its conversion to a Mawco would be at reasonable cost. Timbering systems already well established would not necessitate substantial alteration for the Mawco miner and the bulk output would be comparable to the shearer loader.

### Description of the Mawco

The machine to which the 42-in. Mawco frame is fitted is made by British Jeffrey-Diamond, Limited, and is equipped with a magnamatic haulage end giving variable speeds up to 14 ft./min. Power is provided by a 80-h.p. water-cooled motor. The waste water from the motor is used to suppress dust produced by the driving sprocket of the chain, the water also assists in keeping the chain cool and lubricated. The chain speed is 450 ft./min. The speed of travel of the machine is about 4 ft. 6 in./min. The Mawco is similar to an Anderton shearer except that the drum is replaced by a frame jib 42. in. high and 20 in. deep. The width of kerf is 6½ in. The frame jib is constructed to allow the upper section of the track to be lowered so that, if necessary, the machine can be flitted back if convergence has taken place; this was, however, never found necessary.

At the change of direction of the track of the frame jib between horizontal and vertical sections is a bend of 7 in. pitch line radius, the outside clearance pick at this point forming a fillet of 10 in. at the roof and floor.

The chain is a single Hoy side-flexing ball-joint assembly which cuts out a segment of the coal face at the roof, back, and floor. The machine is mounted on an armoured flexible conveyor by means of a specially designed underframe which raises the machine so that it cuts at floor level. Behind the machine and attached by a rigid coupling is a fabricated plough. During the cutting run the plough deflects the cut coal onto the conveyor and is so designed to induce fractures in the block of coal, thus providing lumps of a size which can be conveyed without trouble. On the reverse run the plough loads all the loose coal left in the track and it is not necessary for men to work on the face side of the conveyor.

An important feature of the Mawco is the shape of the section cut by the frame jib. The curve or fillet left in the coal by the chain gives the effect of an arch support and tends to minimize convergence. A horizontal breaker bar equipped with picks can be fitted on the axis of the chain sprocket. This rotates at the same speed as the sprocket and serves to break up coal of a size too large for the conveyor system to handle. With the smaller size of frame at Littleton this breaker bar was not used.

FIG. 2.—LOCATION OF 208S NORTH-EAST BROOCH FACE AT LITTLETON COLLIERY.

### Operation

Two stable holes, one at each end of the face, are required for the loader; these are approximately 8 yd. long to accommodate the tail-end conveyor drive and at the loader gate for the length of the plough and jib frame and the forward conveyor drive. The first operation is to cut a 20-in. web throughout the length of the face; on the return run the conveyor is snaked over behind the machine. Then the chocks and single-hydraulic props are moved forward 20 in. The face is then prepared for cut-

ting the face again. It is usual practice for the dayshift to start with 30 yd. of conveyor, chocks and props moved over, and the machine oiled and picks renewed ready to cut. As the machine cuts forward the workmen are moving over the conveyor, chocks, and props in advance of the machine; the dayshift usually doing two strips or runs through the face. The afternoon shift men move over all the conveyor, chocks, and props and make one run through the face. The machine is then returned to the main-gate stable and the first 30 yd. of conveyor, chocks, and props are moved over to be in the same position for the dayshift to commence cutting.

The first cutting chain was broken after cutting 700 yd. of face and, on examination, the ball stems and liners which connect the pick boxes together were found to be badly worn and the chain was replaced. After the first chain had only cut such a short distance it was decided to lubricate the chain with molybdenum disulphide every day. Subsequently, Austin Hoy & Company, Limited, treated the chain with this lubricant before despatch from their works.

The first chain had a pickline which included five spade boxes. The purpose of these spade boxes was to clear the gummings from the chain, this had been found necessary at another colliery where gummings were not clearing the chain and the speed of the machine was reduced in consequence. It was seen on close examination of the chain that the spade boxes were wearing. A centre pick box, shown in Fig. 3, was developed to replace the five spade boxes, which improved the yardage cut before excessive wear made the chain unserviceable. It is now considered that after one box has been taken out and the wear taken up, the chain should be sent back to the manufacturers for overhaul. If this is done wear is confined to the ball stems and the liners of the joint and these can be renewed quite easily at a reasonable cost. The chain with five centre pick boxes cut 5,900 yd. of face before it had to be replaced.

The chain with ball stems and liners of a special material cut 9,000 yd. The cost of a new Mawco chain is £345 and the estimated cost of reconditioning depending on the condition of the chain is about 50 per cent. of this initial charge. The operating life of the frame jib is protected by renewable wearing strips on the inside of the upper and lower vertical bends and also on the inclined guides leading to the sprocket. These strips are inspected weekly to ascertain the amount of wear. The curved wearing strips on the bends require renewing after every 10,000 yd. of cutting.

At the loader gate there are electric switches for the conveyor, coal cutter, and Mawco, together with a loudspeaker and telephone and power pack for the hydraulic chocks and also a signal unit for the conveyor. These take up a considerable length of roadway where supplies would have to be handled and to overcome this difficulty a Becorit monorail transporter was installed.

### Method of Support

The face, other than the stables, is supported by Seaman Gullick, four leg, chocks with two Groetschel link bars fixed to each chock for the cantilever support over the conveyor. These chocks are set at 4-ft. centres, as shown in Fig. 4. Each chock is equipped with a hydraulic ram, to push over the conveyor or to pull the chock forward. Every fourth one is a combined push-pull ram, the remainder being pulling rams only.

Between the chocks and up to the Westfalia armoured conveyor is set a Dowty prop with a 2-ft. wooden lid. This prop supports the roof while the chock is lowered and moved forward. The speed of travel of the Mawco is dependent upon the speed at which the chocks and conveyor can be moved over and the men can, with Gullick chocks, exceed the speed of travel of a shearer cutting at 10 ft./min.

With the experience gained in total caving with Seaman Gullick chocks in the Brooch Seam, the system, using steel bases, Meco releases, and wooden chock blocks, has been successfully extended to two other faces in the same seam with a resulting increase in productivity.

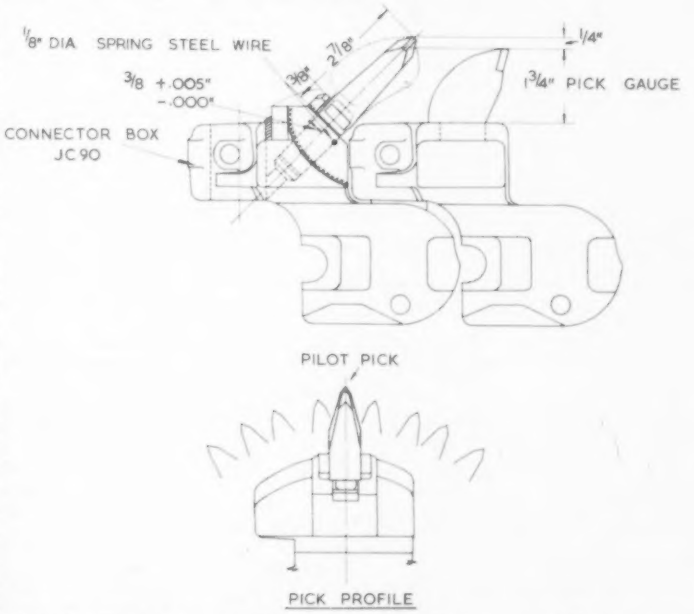
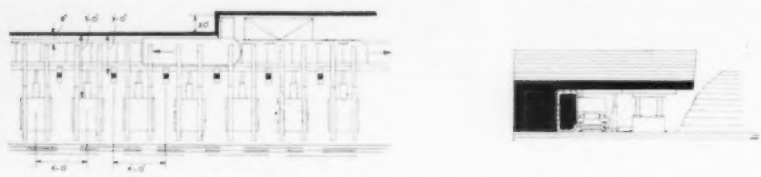
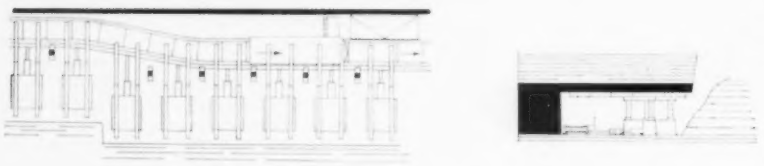



FIG. 3.—DETAILS OF THE CENTRE PICK BOX DEVELOPED TO REPLACE THE FIVE SPADE BOXES.



PLAN & SECTION SHOWING MACHINE CUTTING



PLAN & SECTION SHOWING MACHINE FLITTING & CHOCK ADVANCEMENT

FIG. 4.—METHOD OF WORKING THE MAWCO IN RELATION TO THE SELF-ADVANCING ROOF SUPPORTS.

## Manpower

The team required for the operation of the Mawco machine on a 200-yd face is 15 men, disposed as follows:—Mawco machine men, 2; grading conveyor, 1; moving over chocks, props, and conveyors, 8; forming stable holes, 4.

This team is duplicated on the second shift. Two men cut the stables and bore the holes. In addition rippers, packers, and men for moving in the gate-feeder chain are required.

Table 1 shows the results obtained to the end of October, 1960.

The average face o.m.s. was 150 cwt.; the highest obtained for one week was 166.6 cwt. and compares favourably with other mechanized coal-getting results on longwall faces.

It is considered that with a 100-h.p. motor the speed of cutting could be increased and, consequently, while the large coal will not materially be affected, the quantities of the fractional sizes will be reduced. It must also be remembered that the machine is taking out the full mined section and no advantage is gained by coal tops following and adding to bulk tonnage.

The contract shift earnings of the men are 54s. plus 6s. for completion of the 400-yd. norm and, with a secondary bonus, makes the gross earnings 76s. 8d. per shift.

TABLE 1.—*Monthly Manpower and Production Details of 208s Mawco Loader Face.*

| | Two weeks August. | Five weeks September. | Four weeks October. |
|---|---|---|---|
| | Shifts. | Shifts. | Shifts. |
| Stables | 76 | 180 | 149 |
| Chocks | 177 | 379 | 288 |
| Machine operator | 42 | 104 | 81 |
| Grader | 21 | 52 | 40 |
| Cogging | 14 | 43 | 55 |
| Coal cutting | 20 | 46 | 40 |
| Ripping | 90 | 193 | 140 |
| Other face work | 50 | 139 | 87 |
| Shotfirers | 23 | 56 | 52 |
| Total | 513 | 1,192 | 932 |
| Raised and weighed (tons) | 3,199 | 8,911 | 7,292 |
| Raised and weighed o.m.s. (cwt.) | 124.7 | 149.5 | 154.5 |
| No. of strips | 23 | 66¼ | 57¼ |

## Conclusion

Due to the narrow web and the curved fillet at roof height, the machine can be used successfully under poor roof conditions. The Mawco miner in its present form has certain mechanical weaknesses which need to be overcome. The manufacturers have these problems in hand so that a machine and chain will be produced that will withstand the harder cutting problem in the Brooch Seam.

The larger size of product obtained from the Mawco cutter compared with a shearer is a step nearer to meeting the large-coal demand.

TABLE 2.—*Comparison of Coal Size Produced by the Mawco with Other Methods of Working.*

| Quality. | Size. | Hand-filled. | | Mechanized. | |
|---|---|---|---|---|---|
| | | Explosives. | Air-breaker. | Shearer. | Mawco. |
| | | Per cent. | Per cent. | Per cent. | Per cent. |
| House coal | +6-in. | 4.1 | 13.2 | 0.4 | 5.0 |
| Washed cobbles | 6-in. to 3-in. | 8.4 | 10.1 | 1.4 | 5.3 |
| Washed nuts | 3-in. to 1½-in. | 17.3 | 15.5 | 3.8 | 18.8 |
| Washed DS nuts | 1½-in. to ¾-in. | 19.6 | 15.0 | 14.2 | 11.0 |
| Untreated smalls | — | 50.6 | 46.2 | 80.2 | 59.9 |

Acknowledgment is made to the officials and workmen of the colliery for their efforts in making the working of the Mawco miner a success. Tribute is also paid to the Area mechanization team for its work and also to Austin Hoy & Company, Limited, High Wycombe (Bucks). The author thanks the Area general manager for permission to publish this paper and wishes to state that any views expressed are his own and not those of the National Coal Board.

## DISCUSSION

MR. T. L. CARR, the branch president, said a most interesting account had been given of the application of the Mawco cutter loader. Success had been achieved despite the fact that the seam apparently was not very suitable for the operation. He asked

the author what were the special characteristics of a seam in which success with the machine could be assured. Mr. Carr also asked what were the weaknesses referred to in the paper and how were they being overcome.

In reply, the author said he did not think the seam affected success as much as the enthusiasm of the men. The weakness of the Mawco was the chain life. So far it had done 9,000 yd. of cutting before being replaced which was not as good as in the East Midlands where they did 20,000 yd. of cutting before renewal. MR. F. BRAMMER, a representative of Austin Hoy & Company, Limited, demonstrated a sample of a new chain which, he said, had been designed for 125 b.h.p.

MR. T. L. CARR said the results were obviously due to the successful operation of the machine and asked if the author attributed the short chain life to the hard coal at the bottom of the seam. He also asked if the coal parted easily from the floor of the seam. The seam had always been a difficult one to work, replied the AUTHOR, and the coal did not fall from the face because the roof was formed by the machine. There was no floor parting and it did not matter whether there was one when using the Mawco. The short chain life was due to the hard band of coal in the bottom of the seam. With a soft coal they would not have experienced the excessive wear of the ball-stem liners.

### Breaker Bar not Necessary

In reply to MR. J. H. WILKINSON, the AUTHOR said pre-cutting was not used. Mr. Wilkinson said he had tried pre-cutting with Mawco in a very hard seam, but no increase in cutting speed was obtained. He asked the author if he used a breaker bar on the machine, for at Cannock Wood Colliery it had been found the machine worked better without one. Replying, the AUTHOR said that in cutting at floor level, and this was the hardest part of the seam, an underslung jib was used. A breaker bar was not necessary because the coal broke up naturally into lumps of suitable size for the conveyor to handle.

MR. KING asked the AUTHOR to comment on the difference in large-coal percentage between the 28 per cent. described in the paper, and the 55 per cent. shown in a film at the meeting. The AUTHOR said the reason was that at Whitwell Colliery, where the film was made, a larger frame was used than the one at Littleton Colliery. At Littleton only a 20-in. cut was being taken whereas in the film it was 27 in.

MR. H. WRIGHT said he was interested in the new chain. The maximum cutting he had experienced was 4,000 yd. He had never seen better roof conditions than the Mawco provided, but unless the makers could design a chain which could withstand 125 b.h.p. he saw no hope of the successful application of the machine. He asked what was the size of the kerf of the new chain. MR. BRAMMER said the curve was 6½ in.; it was designed for a 125-b.h.p. machine, and was able to carry the gummings from the back of the cut. The picks were 1¾ in. and provision was made for a long gauge to get greater pick penetration.

MR. A. E. DARLOW asked what was the time taken for a complete cycle of operations. He noticed that the chain was lubricated with molybdenum disulphide every day, but subsequently the makers treated the chain before despatch from the works. He asked how this was done and if better results were achieved. In reply, the AUTHOR said the fastest time taken for the complete cycle over the face was about 2½ hr. The chain was dipped in a solution of molybdenum disulphide before it left the works and a skin was formed on the metal. He thought, however, that they were getting better results when it was being treated before each shift.

MR. J. EVERY asked whether any difficulty was experienced with the self-advancing supports and what precautions had to be taken against conveyor creeping. The AUTHOR said there was no difficulty in operating supports. The conveyor did creep, but every two weeks they took a pan out at the bottom of the face and put one in at the top.

Replying to MR. C. GILBODY, the AUTHOR said he did not know if the fillets of coal left by the Mawco were advantageous, but it was claimed that they helped to support the roof and assist in moving over the conveyor. In answer to a further question by MR. EVERY, on the effects of the steep gradient on the conveyor drive, the AUTHOR said the conveyor ran satisfactorily in spite of the steepness of 1 in 4.

Replying to a question about costs of maintenance the AUTHOR emphasized that the operation was an experiment. There was very little trouble with the machine and the wages cost averaged 10s. 2d. per ton.

MR. CHAMBERS asked if any measurements were taken of the amount of energy used by the loader and what had been done to reduce the kerf. The AUTHOR said no energy measurements were taken and MR. BRAMMER said the kerf could not be reduced because 6½ in. was the minimum for that machine.

Moving a vote of thanks, MR. WILKINSON said that he had always been a great believer in the disc machine and the Mawco, in his view, was the next best thing to the disc machine. He did not think it was beyond the ingenuity of the mining engineer to overcome the difficulty regarding the chain. Success in operation was chiefly due to the roof conditions which the machine created. He would like to see the Central Engineering Establishment of the National Coal Board taking more interest in the machine, because he felt there was a place for it in many coal seams.

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## *Minister Praises India's Coal Output Effort*

PRAISE for "the team work at all levels in the National Coal Development Corporation" on the successful completion of the target assigned to it in the Second Five-Year Plan has been forthcoming from Sardar Swaran Singh, Minister for Steel, Mines, and Fuel, Government of India. He said: "Your corporation can indeed take pride in having attained a rate of production of 13,700,000 tons a year during the last quarter of the final year of the plan, as against a target of 13,500,000 tons. This represents an increase of nearly four and a half times over the production at the beginning of the plan when the corporation was formed."

The Minister said that the corporation's task for the Third Plan was herculean; it would have to raise production to over 30,000,000 tons at the end of the plan.

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IN ORDER TO INVESTIGATE the establishment of a steel industry in Tasmania, a company with a paid-up capital of £1,000,000 has been formed. Mr. E. R. Hudson, who said in Hobart that he was not able to reveal the name of the company he represented, has been granted exploration licences by the Tasmanian Government over iron-ore deposits at Savage river, on the west coast, and on coal deposits on the east coast.

# Automatic Temperature Control Equipment

NEW hardening and normalizing and tempering installation shown in Fig. 1 is at the works of the British Steel Chain Company, Limited, Old Hill (Staffs). The hardening and normalizing furnace, shown with its cover partly removed, is by the Incandescent Heat Company, Limited, Smethwick, Birmingham. It is arranged for town-gas firing using radiant bowl burners and is suitable for operating within the temperature range 700 to 950 deg. C. This application ensures uniform temperature conditions through the heating chamber, high rate of heat transfer to the stock, and maximum thermal efficiency.

The effective working dimensions of the furnace are 7 ft. deep by 5 ft. dia. for dealing with chains having a maximum length of 90 ft. of 2-in. thick material.

The combustion system is divided into two zones, each zone being equipped with Metalectric automatic temperature controlling and recording equipment. The cover is carried on a mild-steel frame mounted on bogie wheels and is raised from the sand seal by four hydraulic jacks, while traverse of the lid and supporting frame is by handwheel.

The furnace chamber is lined with high-temperature insulation refractories backed by high-grade solid insulation, the complete brickwork structure being enclosed in a reinforced steel casing. The work is carried on a specially designed jig and support stand. Tempering is carried out in a furnace supplied by Metalectric Company, Limited, a subsidiary of Incandescent Heat. It is electrically heated, has vertical air circulation, and the dimensions are similar to those of the hardening and normalizing unit. The swing lid is operated in conjunction with a simple geared lifting device.

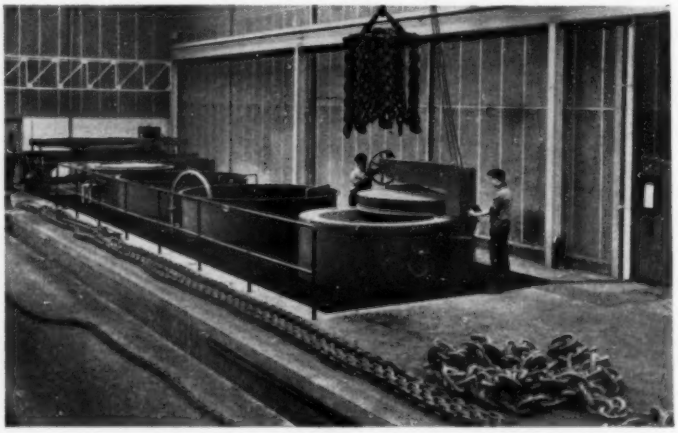

FIG. 1.—BRITISH STEEL CHAIN HEAT-TREATMENT PLANT.

It is designed for temperatures up to 750 deg. C. and the electrical rating of the furnace is 222 kW. The whole plant is complete with oil and water quench tanks, together with recirculation and cooling devices.

## *Forthcoming Events*

JUNE 6-9

*Association of Mining Electrical and Mechanical Engineers*:—Annual meeting and convention at Harrogate.

JUNE 8

*Midland Institute of Mining Engineers*:—Meeting at the Danum Hotel, Doncaster. "Multi-jib Coal-cutting Machines and their Further Development," by D. Hinchcliffe, W. B. Cadman, and C. Meryett.

JUNE 10

*South Wales Institute of Engineers*:—Golf meeting at the Royal Porthcawl Golf Club.

JUNE 14

*Institution of Production Engineers*:—Meeting in the Large Lecture Theatre, Engineering Faculty, University of Bristol, at 6.30 p.m. Viscount Nuffield Paper: "Some Aspects of Engineering Progress," by Sir Willis Jackson, FRS.

*Midland Counties Institution of Engineers*:—Annual golf competition at the Sherwood Forest Golf Club, Mansfield, at 2 p.m.

JUNE 15

*North of England Institute of Mining and Mechanical Engineers*:—Meeting at Neville Hall, Newcastle-upon-Tyne 1, at 2.30 p.m. "A Hydro-electric Project," by H. F. Coleman.

### National Association of Colliery Managers

JUNE 6-8

Annual general meeting and conference in Edinburgh.

JUNE 10

*Scottish Branch*:—Annual golf and bowling outing at Gleneagles at 10 a.m.

### Ore Beneficiation Research

Research on ore beneficiation is to be carried out jointly by France and Germany in a project costing $506.000, towards which the High Authority of the European Coal and Steel Community is to make a grant of $330,000. The research will be carried out into the beneficiation of ores in Lorraine, Luxembourg, Salzgitter-Gifhorn, and North Germany which have previously been uneconomic to use. The Neue Zürcher Zeitung reports that the High Authority is interested in an improvement in the Community's ore supplies in view of the possibility of a shortage in 15 to 20 years' time.

# *Accelerating the Melting Rate in Arc Furnaces*

*In this paper, the authors, A. F. Kablukovskii, V. I. Simonov, T. I. Zuev, and Yu K Borob'ev, of the Elektrostal' Works, describe changes in practice mainly relating to deoxidation procedure which resulted in substantial reductions in heat time and consumption of electrical energy. The paper is translated from Metallurg, 1960, V, No. 9, pp. 19-20.*

UNTIL now, for the various techniques of making structural steels in electric arc furnaces, such as, melting of a virgin charge with a boil, remelting of alloy scrap, and the duplex method, the reducing period has normally been worked in the same manner, for the most part employing diffusion deoxidation of the metal through the slag.

Thus, at the Elektrostal' Works, during the making of ShKh15 ballbearing steel in 20-ton basic arc furnaces, diffusion deoxidation was employed in the reducing period, the metal being held under a carbide slag for not less than 1 hr.

Forty minutes after the start of refining, ferrochromium was added to the deoxidized metal; after 10 to 15 min. and before tapping the heat, the carbide slag was changed into a white slag, and lump ferro-silicon was added to the bath. Before tapping into the ladle, the metal was deoxidized with lump aluminium in bar form (0.4 kg./m. ton). The overall duration of the refining period was from 1 hr. 40 min. to 2 hr. 10 min.

With the aim of increasing the output of ballbearing steel without lowering the quality of the finished metal, a new technique was developed and introduced, which differs from that adopted earlier in the following respects:—

(*a*) Combination of the processes of partial dephosphorization of the metal and melting down of the charge, through the addition of lime and ore to the bath at the end of the melt-down period;
(*b*) a reduced carbon content at the start of the oxidizing period, which necessitates the elimination of carbon during the period of the boil to not less than 0.30 per cent.; this ensures the necessary degasification of the metal;

(*c*) preliminary precipitation deoxidation of the metal at the end of the oxidizing period by refining with pig-iron, containing 4.0 to 4.5 per cent. carbon, 8.0 to 10.0 per cent. manganese, and not more than 0.030 per cent. phosphorus, added in an amount of 7.5 to 12.5 kg./m. ton.;

(*d*) supplementary precipitation deoxidation of the metal, before shaping up the reducing slag, with lump silico-chromium type 50 (5.0 to 6.0 kg./m. ton) and aluminium in bar form (0.4 kg./m. ton;
(*e*) the addition of the main part of the ferrochromium to the metal when not covered by a slag, without preliminary diffusion deoxidation;

(*f*) deoxidation of the slag with coke fines and 75 per cent. ferro-silicon, and final deoxidation of the metal before tapping with lump aluminium (0.5 kg./m. ton);
(*g*) an overall duration of the reducing period to be 60 to 70 min.

The degree of contamination of the metal with non-metallic inclusions was checked on 33 experimental melts to comply with GOST 801-47, and supplementarily on 12 specimens in accordance

TABLE 1.—*Technical and Economic Figures for Experimental and Normal Heats.*

| Indices. | Method of melting. | | | | | |
|---|---|---|---|---|---|---|
| | Virgin charge with use of oxygen. | | | Remelting of scrap charge with use of oxygen. | | |
| | Melts. | | Increase (+) or decrease (−). | Melts. | | Increase (+) or decrease (−). |
| | Normal. | Experimental. | | Normal. | Experimental. | |
| Number of heats | 31 | 9 | — | 60 | 16 | — |
| Net duration of whole melt down period, min. | 75 | 70 | −5 | 102 | 100 | −2 |
| Overall duration of whole melt down period, min. | 81 | 75 | −6 | 116 | 122 | +6 |
| Consumption of electrical energy over the whole melt down period, kWh | 8,150 | 7,740 | −410 | 9,920 | 9,730 | −190 |
| Net duration of boil, min. | 51 | 45 | −6 | — | — | — |
| Overall duration of boil, min. | 64 | 61 | −3 | — | — | — |
| Consumption of electrical energy for the boil, kWh | 2,470 | 2,300 | −170 | — | — | — |
| Overall duration of refining period, min. | 105 | 66 | −39 | 105 | 66 | −39 |
| Consumption of electrical energy for refining period, kWh | 3,340 | 2,080 | −1,260 | 3,100 | 2,080 | −1,020 |
| Net duration of whole heat, min. | 222 | 179 | −43 | 205 | 166 | −39 |
| Overall duration of whole heat, min. | 250 | 202 | −48 | 221 | 188 | −33 |
| Interval between heats, min. | 41 | 46 | +5 | 43 | 40 | −3 |
| Consumption of electrical energy for the whole heat, kWh | 13,975 | 12,120 | −1,855 | 12,930 | 11,810 | −1,120 |
| Consumption of electrical energy for sound product, kWh per m. ton | 700 | 625 | −75 | 642 | 595 | −47 |

with the TsNIIChM scale. The mean data from the check show that, in the experimental and normal heats, the degree of contamination of the metal with non-metallic inclusions was practically identical.

Fundamentally, on account of the shortening of the duration of the reducing period, melting of ShKh15 ballbearing steel in the 20-ton arc furnaces by the method of synthetic precipitation-diffusion deoxidation, makes it possible to cut down the time for a heat from a virgin charge by an average of 48 min. and by 33 min. for a heat from a scrap charge, *i.e.*, by 15 and 19 per cent., respectively (see Table 1). Under such conditions the average saving in electrical energy for heats from a scrap charge was 47 kWh./m. ton. sound ingots, and for those from a virgin charge 75 kWh./m. ton.

At the Elektrostal' Works this method is used at the present time for producing a series of structural and tool steels of the following types:—0.12 C-Cr-3Ni, 0.18 C-Cr-Ni-V, 0.4 C-Cr, Cr-V, 0.6 C-2 Si, etc.

# HEAVY-OIL INJECTION INTO BLAST FURNACES

AIMED at proving the feasibility of a 75-year-old ironmaking idea which promises to result in what is considered to be the most important iron-manufacturing development in the past 20 years, Esso Research & Engineering Company, affiliated to the Standard Oil Company (New Jersey), has been experimenting with the injection of hydro-carbons, particularly heavy oil of high calorific value, into the tuyere area of a blast furnace.

The idea, recently reported,* involves taking advantage of the chemical as well as the heating capacity of the oil which can be injected along with the hot blast through the tuyeres so that the oil not only supplies part of the heat but also a proportion of reducing gases. To arrive at a suitable system, the company designed, built, and operated a pilot plant simulating that part of a blast furnace most responsive to oil injection. A unit of this system was later installed and tested on a large-scale furnace with, it is claimed, complete success.

One of the most important developments in this connection is the fuel injection and control system adopted. Since blast furnaces operate continuously over long periods the method of installation must avoid interrupting the process. Sufficient accurate data, however, is not yet available regarding the possible output increase and saving in operating costs likely to be obtained, and to this end Esso Research & Engineering is at present devoting attention.

* Blast Furnace and Steel Plant, December, 1960.

# New Copper-Plating Process

RECENT work in the Albright & Wilson (Mfg.), Limited, laboratories at Oldbury, near Birmingham, has resulted in the development of a new electrolyte based on pyrophosphate for copper plating. The Pyrobrite bath, it is stated, gives far better results than any other copper-plating method—results which have already been amply confirmed in industrial practice under a wide variety of operating conditions from decorative uses to electroforming.

Albright & Wilson manufactures and supplies all the constituents necessary for the Pyrobrite bath, the main feature of which is the new PY61 addition agent. This ensures fully bright deposits over a wide current density range. The bath has good levelling characteristics and produces close-grained, smooth deposits, which do not finger-mark or spot out. The Pyrobrite bath plates fasters than acid or cyanide solutions under normal operating conditions, because higher current densities are possible. It also has excellent throwing power. Because it contains no cyanide, there is no need for fume extraction and there are no problems associated with the disposal of effluent. The solution itself is only mildly alkaline and does not attack light alloys to any appreciable extent.

Pyrobrite copper pyrophosphate plating is ideal for electroforming, for example, in the preperation of moulds for plastic dolls. It provides a very dense, smooth deposit without the formation of nodules. Because the deposit is non-porous, a relatively thin layer forms an efficient stop-off medium during nitriding or carburizing of steel.

Another important application for the process is in copper plating prior to bright nickel and chromium plating of zinc-based diecastings and steel. The good levelling properties of the solution often make it possible to eliminate mechanical polishing of the base metal before nickel plating directly onto the copper. A "strike" solution based on copper pyrophosphate is available for articles made from steel.

## *Italy Produces More Iron and Steel*

OUTPUT figures given in the Italian Economic Survey, published by the Association of Italian Joint Stock Companies, reveal that steel production in 1960 increased by 21.7 per cent. over 1959, the respective tonnages being 8,230,000 and 6,762,000.

Pig-iron production increased by 27.9 per cent. last year, the 1960 output of 2,683,000 tons comparing with the previous year's 2,098,000 tons.

THE FIRST blast furnace has been blown-in at the new steelworks (Portugal's first) being built on the Tagus, reports Handelsblatt from Düsseldorf. The works was constructed for the Siderurgia Nacional by a German-Belgian group under the leadership of Demag.

# *Meeting the Challenge to Coal*

## *Presidential Address to South Midland Colliery Managers*

by L. J. MILLS,* B.Sc.(Hons.), M.I.Min.E.

**Confidence in the future of the coal-mining industry can only be justified if the challenge of today is met and management equips itself to meet the challenge of tomorrow. The way in which the south Derbyshire and Leicestershire coalfields are meeting this double task is discussed in this presidential address, given to the South Midland Branch of the National Association of Colliery Managers on April 10, 1961.**

DURING the past year some facets of the challenge of change affecting the coal-mining industry in the south Derbyshire and Leicestershire coalfields have become clearer and some of the problems have crystallized. The pattern which emerges is far from depressing; indeed, in many respects it is an extremely happy one. Nevertheless, there is no room for complacency.

The magnitude of the challenge has not diminished; if anything, it has increased and the mining engineer, as much as ever before, is sandwiched between the two Ms of market demands and manpower, with mechanization, wisely and efficiently used, as his greatest means of meeting the challenge.

### Marketing

In 1960, inland consumption of coal in Great Britain amounted to 197,044,000 tons and exports were 5,368,000 tons, giving an overall consumption of 202,412,000 tons. Since the corresponding figure for 1959 totalled 193,882,000 tons, there was in effect, a rise in consumption of approximately 8,500,000 tons. Output, however, partly due to deliberate National Coal Board policy and partly because of the steady decline in manpower, was about 12,250,000 tons less in 1960 at 193,734,300 tons (including 7,579,700 tons from open-cast working) than in 1959. There was, therefore, a deficit between production and consumption during 1960.

In terms of bulk output alone the position could be regarded as satisfactory because the shortfall between the annual output and annual demand could be met from existing stocks. Indeed, undistributed stocks of coal fell from just over 36,000,000 tons at the end of 1959 to approximately 29,000,000 tons at the end of 1960 as a result of a lift of more than 6,000,000 tons.

In the south Derbyshire and Leicestershire coalfields the statistics in regard to coal stocks are encouraging. From a peak of over 1,010,000 tons of grounded stock at September, 1959, two successive winters had reduced the level to approximately 483,900 tons in March, 1960. The demand for the type of coal has been strong. Stocks of small coal fell during the summer months of 1960 from 584,500 tons in March to 530,300 tons in September. During the 1960/61 winter the lift of small coal continued, reducing the tonnage still further to 477,300 tons. Graded coal was also in such demand during the 1960/61 winter that of an extra 63,500 tons of graded coal brought in from outside the No. 7 Area of the East Midlands Divisional Coal Board, 57,900 tons were sold in addition to the locally produced grades. Present stocks of graded coal only amount to about 5,000 tons, as compared with 206,900 tons in September, 1959. Meeting future demands for large coal will present the greatest problem. Stocks of this commodity were as follow:—September, 1959, 161,500 tons; March, 1960. 31,200 tons; September, 1960, 30,100 tons; and March, 1961, 1,800 tons. These figures indicate that demand for large coal in the Area is outstripping production.

Taking a purely parochial view, one can be encouraged by the demand for all grades of coal from the Area, but having regard to the national position, efforts must be redoubled to the production and careful stocking of large coal to have the maximum available for disposal next winter.

*Deputy production manager (operations), No. 7 Area, East Midlands Divisional Coal Board.

The domestic demand nationally in 1960 was approximately 2,000,000 tons above that of 1959. This was against a reduced current production and against a background of degradation due to coal stocking. The mining engineer, therefore, finds that he has to produce more large coal in an attempt to meet the national demand, but this has to be produced against a background of lower global output and degradation in the putting down, lifting, and retreatment of stocks. Exactly how long this problem will remain is not entirely clear; it depends so much upon the development of patent fuels for smokeless zones and how rapidly the smokeless zones are extended, but it is probable that large coal will be required for two years at least and probably even four or five.

Apart from "size" of coal, to win the marketing battle against competitors, vigorous action is needed to maintain and even improve the consistency of quality, often against a background of working more inferior seams as the better reserves approach exhaustion. Stable prices are absolutely vital. The chairman of the National Coal Board has virtually pledged himself to such a policy and this can only come as the direct result of improved efficiency.

Reference was made, in the last presidential address to this branch, to the CEGB policy of adding to the power station generating capacity on the river Trent. The effect of this will, it is estimated, increase the demand for small coal from the south Derbyshire and Leicestershire coalfields from the present level of about 2,726,000 tons per annum to 3,700,000 tons in 1965 and 4,230,000 tons in 1970. Heartening as this demand may be, the maintenance of profitable working will only be possible by much greater efficiency to offset the reduced average proceeds per ton likely to result from this power station demand.

In common with the national picture, the manpower in south Derbyshire and Leicestershire has been steadily declining. From a peak of 14,950 men at the end of September, 1957, there has been an almost steady reduction in our labour force, which was accelerated from the beginning of 1960 by the compulsory retirement of those over 65 years of age. At present, the available labour force stands at approximately 12,760, representing a net decrease of nearly 2,200 men. Such a fall in manpower is perhaps not surprising. The necessity to stock coal had a serious psychological effect on workmen and must have aroused fears which were fanned by an often ill-informed and almost always adverse national Press.

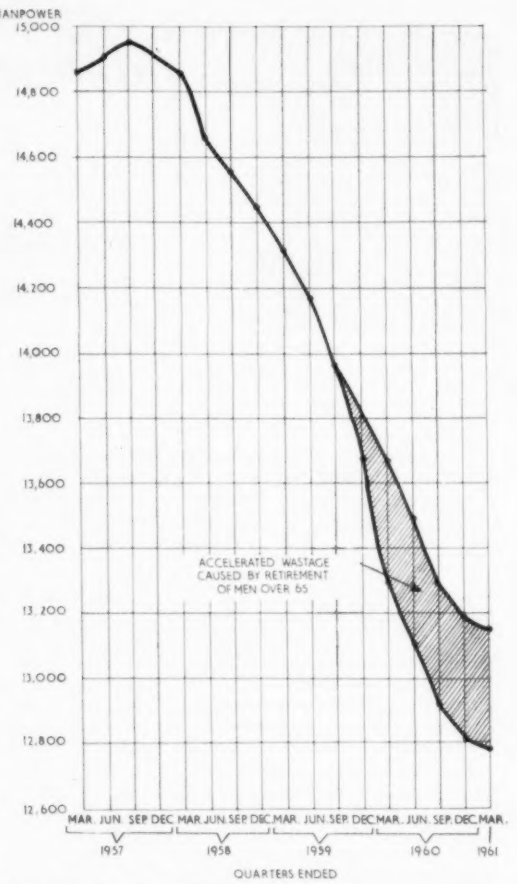


FIG. 1.—GRAPH OF MANPOWER, EXCLUDING APPRENTICES, FOR NO. 7 AREA, EAST MIDLANDS DIVISIONAL COAL BOARD, FROM 1957 TO MARCH, 1961.

There are, however, hopeful signs that the curve of manpower wastage illustrated in Fig. 1, is flattening out and it behoves all to ensure that the present labour force, as well as the public at large, have confidence in the prospects for the coal-mining

TABLE 1.—*O.m.s. and Percentage Mechanized Output for the South Derbyshire and Leicestershire Coalfields.*

| | | 1956. | 1957. | 1958. | 1959. | 1960. | Last quarter of 1960. | First two months of 1961. |
|---|---|---|---|---|---|---|---|---|
| Percentage of mechanized output .. .. | | 13.65 | 26.42 | 33.51 | 38.53 | 45.79 | 50.27 | 54.06 |
| Face o.m.s. (cwt.) | Mechanized .. .. | 166.3 | 172.9 | 162.0 | 163.1 | 170.8 | 170.2 | 174.9 |
| | Conventional .. | 100.8 | 99.1 | 101.9 | 104.8 | 108.1 | 107.9 | 105.6 |
| | Total .. .. | 106.6 | 111.7 | 116.4 | 121.5 | 130.0 | 132.2 | 132.3 |
| Overall o.m.s. (cwt.) .. .. .. .. | | 42.8 | 42.7 | 42.4 | 44:0 | 43.8 | 44.0 | 44.7 |

industry. Apart from recruitment of additional personnel, the only way to combat manpower wastage is by increased mechanization, not only at the coal face but elsewhere underground and on the surface.

### Face Mechanization in the South Midlands

The percentage of annual mechanized output in the south Derbyshire and Leicester coalfields has risen from 13.65 in 1956 to a figure of 45.79 for 1960. For the last quarter the percentage was just over 50 and the current level is between 57 and 58.

Table 1 clearly demonstrates the influence of increasing face mechanization on the total Area face o.m.s., which has tended to rise with the amount of mechanized output, the most marked jump in face o.m.s. amounting to 8.5 cwt. between the years 1959 and 1960. Unfortunately, while the rate of increase in face mechanization and face o.m.s. has been a matter for satisfaction when viewed against the problems of interaction and faulting and the unfortunately abortive attempts to develop the use of the less positive large-coal producing machines, such as the plough, in the tough, woody, poorly cleated seams, the overall o.m.s. has not tended to show the same rising trend. It will be observed that the rise in face o.m.s. of 8.5 cwt. in 1960 was accompanied by a slight fall in overall o.m.s., amounting to 0.2 cwt. Admittedly, the exhaustion of reserves in the northern part of the south Derbyshire field coupled with the revenue reconstruction at Cadley Hill Colliery to replace part of those reserves account in no small measure for this effect. Indeed, the latter scheme is responsible for a depression of approximately 1 cwt. in the overall Area performance for part of 1959 and the whole of 1960.

The results appear to confirm that over the past two years mechanization has been bridging the manpower gap in an attempt to hold output. Unfortunately, the process has resulted in an adverse disturbance of the balance between coal-face workers and others underground. The movement of men, however slowly, away from the coal face is one that has a depressing effect on the young men who are waiting their turn to be upgraded. This factor often accelerates the process of manpower wastage.

Much has been done in No. 7 Area in the elimination of manpower necessary for providing ancillary services to the faces. In the field of materials handling alone, 200 men were saved in one year by methods improvements, and experiments are continuing on new methods of materials haulage within the Area, which have been the subject of papers to this branch and kindred bodies. It is clear, however, that the process of elimination of manpower becomes increasingly difficult and the effects are only marginal as efficiency increases. Attention is therefore currently being focused on the possible benefits accruing from greater concentration.

The economics and benefits of concentration have been dealt with in a number of papers to professional mining bodies over the past two years, the stress being laid on concentration of working by two and three-shift operation of mechanized faces. The need for the maximum length of face consistent with machine performance and geological conditions has been postulated, together with the maximum rate of advance per 24 hr. to give larger average daily outputs per face. In this way greater concentration of layout is possible thereby achieving the maximum economies in haulage and lengths of roadways to be maintained with consequential savings in manpower in the category "Others underground." There can be no doubt that on a pit basis this must be the aim and efforts must be directed to achieving the highest possible index of overall concentration at our pits.

Basically, the objective of "concentration" in all its phases may be described as that of saturation of manpower with the maximum amount of output associated with its particular function. This is illustrated by the example of the conveyor attendant, who is necessary irrespective of whether the belt for which he is responsible carries 300 or 1,000 ton/shift, or the washery attendant whose duties need to be executed over the shift quite independently of the throughput of the plant. In an Area where, out of 18 collieries, 10 are traditionally single-shift winding units and only eight are turning coal on two shifts, the problem of concentration of working by double- or treble-shifting may not be easy to achieve. The situation at the double-shift pits needs to be most critically examined, particularly where manpower levels have fallen seriously and where the daily output has fallen well below the double-shift shaft capacity. In such a case it would be better that the unit in question should be reduced to single-shift winding, retaining, possibly, one mechanized face on double-shift working and bunkering the afternoon shift coal. The manpower so released could then be redeployed at the remaining double-shift pits to keep them up to maximum performance and efficiency by concentration of layout and working.

### Contraction can Lead to Concentration

In certain circumstances such a contraction can lead also to concentration, as is instanced by a particular case. A double-shift winding unit having a shaft capacity of 240 ton/hr. was producing an average daily saleable output of 1,460 tons at an overall o.m.s. of 40.9 cwt. with an overall cost of 53s. 5.2d./ton. Over 270 men were transferred to neighbouring double-shift winding collieries, which, in consequence, were able to regain their optimum performance as a result of the replacement of manpower. Following the changeover to single-shift winding and the completion of intensive salvage work, the overall o.m.s. has risen to 58 cwt., with a resultant total cost of 49s. 5.2d./ton.

Table 2 compares the basic statistics prior to the changeover with those when the unit was converted to single-shift winding. The contraction of output enabled the unit to concentrate all its

TABLE 2.—*Concentration as a Result of Single-shift Winding.*

| | Double-shift winding. | Single-shift winding. |
|---|---|---|
| Average daily saleable output (ton) | 1,460 | 1,239 |
| Men on books .. .. .. .. | 785 | 480 |
| O.m.s. face (cwt.) .. .. .. | 105.7 | 163.6 |
| O.m.s. others underground (cwt.) .. | 110.8 | 161.5 |
| O.m.s. surface (cwt.) .. .. .. | 168.1 | 206.1 |
| O.m.s. total (cwt.) .. .. .. | 40.9 | 58.3 |
| Total cost per ton .. .. .. | 53*s.* 5.2*d.* | 49*s.* 5.2*d.* |
| Indices of concentration: | | |
| (*a*) Geographical .. .. .. | 0.33 | 0.47 |
| (*b*) Face .. .. .. .. | 1.79 | 2.11 |
| (*c*) Overall .. .. .. .. | 0.59 | 0.99 |

output to one main trunk conveyor road. This is illustrated by an almost 50 per cent. increase in the index of geographical concentration.* The index of face concentration has also risen from 1.79 to 2.11, due in some measure to the working of thicker reserves and also by the installation of a Dosco miner producing 600 tons of saleable output in one shift. The overall effect is illustrated by the index of overall concentration, which has increased by almost 70 per cent.

This case has not been highlighted with the object of proving that by conversion to single-shift winding of coal a unit will achieve greater concentration of working and therefore a higher o.m.s. and lower cost per ton, which is the ultimate goal of the mining engineer, provided he is meeting marketing requirements. Indeed, at double-shift turning units the aim must be multi-shift working of faces to increase the indices of geographical, face, and overall concentration.

From an Area standpoint, however, the object may well have to be, in the light of the present manpower position, to ensure that the overall output budget is achieved by working as many double-shift units at full shaft capacity while the remaining units achieve shaft winding "saturation" on a single-shift basis. This leaves some flexibility to meet changes in marketing demand or to absorb any additional manpower should the present trend be significantly reversed.

### Future Trends in Face Mechanization

Just over a year ago the South Midland Branch was privileged to have presented a paper by Mr. R. F. Lansdown concerning past experience and future trends in coal-face mechanization. To comment on this paper, would be highly presumptuous, but the paper made reference to the problem of obtaining high productivity from seams below 3 ft. It was suggested that so long as men have to work and set supports in the working section itself there might be little scope for striking improvements in thin-seam productivity with present longwall methods and techniques. Rather "this was a field for automatic, seam-following conveyor-towing machines of the Carbide Miner type."

The importance of this approach is demonstrated by the following results being achieved in the US with this type of "high-wall" mining:—(*a*) From a 2-ft. seam three men were producing 250 to 300 ton/shift; (*b*) from a 3-ft. seam three men were producing approximately 420 ton/shift; (*c*) at one "high-wall" mine a daily output of 1,750 tons was being achieved from one Carbide miner with an overall m.s.t. for 1960 of 28, including management, maintenance staff, and office workers.

These results may be startling and perhaps one is tempted to suggest that natural conditions are vastly different in this country from those obtaining in America. This view was perhaps supported by the failure in many cases of American techniques when transplanted to this country and applied directly without significant adaptation during the war years. However, in the past decade the British mining engineer has shown that he is capable of marrying original and borrowed ideas and techniques to our conditions and, in many instances, of outstripping performances achieved in other countries.

This bodes well for the current development work being carried out by the board's engineers of a machine remotely controlled for "mole mining." In this connection No. 7 Area, East Midlands Division, can justifiably feel proud that it has provided facilities for and been associated with the early prototype trials of such devices as the nucleonic coal-sensing probe. Experimentation and current production are often strange bed-fellows and require much patience and tolerance on the part of the colliery manager and his staff. In this industry of ours it has been said that we must try and move forward to stand still! Without experimentation, progress cannot be made so that the flight of fancy today can become the accepted practice of tomorrow.

This address has attempted to weigh up the present situation as it affects this particular part of the industry in the south Derbyshire and Leicester coalfields and briefly to indicate our present lines of attack. Peering more into the future there can be no doubt that our prospects are good. Confidence in the future can, however, only be justified if we meet the challenge of today and equip ourselves to meet the challenge of tomorrow.

The views expressed are personal and not necessarily those of the National Coal Board.

* The indices of concentration are defined as: (*a*) Geographical—the ratio of face lengths to length of main haulage road expressed as yd. of face/yd. of main haulage; (*b*) face—the ratio of output to length of face expressed as ton/yd. of face; (*c*) overall—the ratio of output to length of main haulage roads expressed as ton/yd. of main haulage. This is the product of the geographical and face concentration indices.

### FBI Report on Spain

The report of the Federation of British Industries delegation to Spain in February has been published under the title "Spain: a Challenge and an Opportunity." Sir William McFadzean, who led the delegation, says in the foreword that there is little immediate prospect of selling certain consumer goods, but there are good prospects for supplying plant, equipment, and machine tools, and for entering into mutually beneficial partnerships. More British industrialists should visit Spain, not only to see for themselves the potentialities of the market, but also because the Spaniards place a particular importance and value on personal contacts. Copies of the report are obtainable from FBI Print and Publications, 21, Tothill Street, London, S.W.1, price 7s. 6d., post free.

# Metallurgical Patents in the US

## *Some Recent Inventions*

DESCRIPTIONS of metallurgical patents given below have been taken from details published in the Official Gazette of the United States Patent Office.

### Rolling Metal Under Tension

A rolling mill for rolling a metal workpiece, comprises: a support structure; a mill housing fixed in position on the support structure; track rails secured to the mill housing and extending therethrough and rearwardly therefrom. A roll carriage reciprocably arranged in the mill housing and slidably arranged on the track rails and includes a pair of rolls positioned to roll at least a portion of a workpiece. A crosshead is slidably disposed on the track rails. Rack and pinion arrangement positively couples the rolls together to the mill housing, and to the crosshead, which is driven by a suitable gripper carriage slidably supported on the crosshead for relative movement therewith in the direction of the track rails. Variable tension control drivably connects the gripper carriage to the crosshead, a work gripper mechanism being carried by the carriage.—2,696,700.

### Universally Adjustable Guide for Tubes in a Tube Mill

A tube mill has spaced pairs of seam guide and welding rolls between which a formed tube passes with the edges thereof spaced apart until reaching the welding rolls. A welding unit is disposed in advance of the welding rolls for fusing the metal at the tube edges before entering the welding rolls. A device engages the tube edges between the pairs of rolls for guiding the same to the welding unit, the device comprising a holder, a pair of plates depending from the holder for entrance in the space between the tube edges, and means for removably mounting the plates in the holder. A series of means provide for universally adjusting the tube-engaging device for ensuring the spacing and guiding of the tube edges properly relative to the welding unit and welding rolls.—2,970,203.

### Apparatus for Electro-magnetic Stirring

In a furnace having a heat insulating lining constructed and arranged to hold a molten charge of metal, an exterior recess is formed in the lower surface of the refractory lining, an induction coil being supported within the recess in inductive coupling to the molten charge. A non-magnetic jacket lines the recess to support the lining and shield the coil from the molten charge without interfering with the inclusive coupling of the coil to the molten charge.—2,968,685.

### High-strength Alloy for Use at Elevated Temperatures

A steel alloy, characterized by high creep-rupture properties at 600 deg. C., and the steel containing (per cent.):—C 0.05 to 0.30, Mn 0.25 to 0.75, P 0.04 max., S 0.03 max., Si 0.15 to 1.0; Cr 1.0 to 5.0, Ni up to 0.75, Mo 0.50 to 3.50, V 0.15 to 1.0, and Nb 0.15 to 0.75, and an element selected from the group consisting of titanium and tungsten, the element being present in an amount between 0.15 and 0.75 when it is titanium and between 0.15 and 1.0 when it is tungsten, balance being iron and residual amounts of other elements.—2,968,549.

### Hot Patching of Refractory Structures

A method of patching a solid refractory structure that normally is heated to a temperature at least approaching the range of visible red heat, comprises directing onto the structure while it is heated to such a temperature a spray of finely divided particles of an incombustible refractory composition that is solid at the temperature of the structure, heating the particles in the spray to a high temperature sufficient to melt at least one refractory constituent of the particles before they reach the structure, and congealing the sprayed particles together as they accumulate on the heated structure to form a dense solid patch.—2,968,083.

### Hot-metal Valve

A hot-metal valve for a ladle includes a nozzle frame secured to the ladle and having a vertically disposed opening therein, a nozzle disposed within the vertical opening in the nozzle frame the nozzle having an axially disposed hot-metal passageway therein. A secondary passageway in the nozzle is angularly disposed with respect to the hot-metal passageway being circular in cross section throughout its length and extending from the hot-metal passageway outwardly to the side of the nozzle. An angularly disposed passageway in the nozzle frame is disposed in aligament with the secondary passageway in the nozzle. An elongated solid-plug valve circular in cross section rotatably and reciprocably movable in the angular disposed passageways in the nozzle frame and nozzle, is movable into and out of the hot-metal passageway to restrict flow of hot metal therethrough, the diameter of the plug valve being at least twice the diameter of the hot-metal passageway in the nozzle so as to allow closure of the passageway by rotary and reciprocatory movement of the plug valve.—2,968,075.

### Ladle for Cast Clad Ingots

A method of pouring molten metal in the making of cast clad ingots without slag contamination consists in filling a refractory lined ladle having a pouring spout located below the top and extending substantially horizontally, and an inner backwardly inclined wall located above the spout, with molten metal to a point below the position of the pouring spout when the ladle is supported on its base. A plug of heat destructible material is inserted in the open end of the spout, while the ladle is tilted to the pouring position until the slag surface is located above the pouring spout and until there exists a layer of molten metal of considerable thickness above the opening. The slag layer is kept away from the opening by the inclined wall until the plug has been consumed. The tilting operation

is continued thus forming an uncontaminated clad ingot.—2,967,339.

### Method of Operation of a Top-fired Open-hearth Furnace

The process of heating ores and metals in a top-fired open-hearth furnace provided with refractory walls and roof comprising directing a plurality of flames downwardly upon a charge of material in the furnace, maintains fuel rates of from about 750,000 B.t.u./hr./burner to about 6,000,000 B.t.u./hr./burner. The pressure velocity at the burner of an incoming combustion supporting medium into the furnace is controlled to maintain speeds not to exceed 6,000 ft./min. for a 4-ft. roof height, and varying the speeds approximately directly as the square of the roof heights above the bath level measured in feet for furnaces of greater roof heights, whereby the velocity is maintained sufficiently low to prevent scorification of the refractories of the furnace.—2,970,829.

### Device for Handling a Repair Piece for a Furnace

A device for handling a repair piece for a furnace and inserting through an opening in the furnace wall, the repair piece having a width greater than the width of the opening and a thickness substantially less than the width of the opening and having a horizontal hole in the face thereof. The device comprises means for attachment to a charging machine, a bracket, a vertical shaft rotatably mounted on the furnace end of the bracket, and an arm attached to the shaft for insertion in the hole of the repair piece, the arm being of sufficient length that the repair piece supported thereon clears the bracket so that the repair piece may be moved from a position in front of the bracket to a position substantially normal thereto alongside the bracket.—2,969,884.

### Process for Cleaning and Recovering Scrap Metal from Slag and the Like

A method of recovering metal in the nature of iron and steel of sufficient purity for open-hearth utilization from slag dump refuse containing refractory material, magnetic and non-magnetic malleable metal, magnetic or non-magnetic friable slag and magnetic ore and metal of large to small sizes that are held by slag. The method comprises, continuously moving a mass of the slag dump refuse while progressively subjecting it to a rotary hammer impaction of increased intensity and freeing metal of progressively smaller size from the slag, passing the mass being impacted through passageways of progressively smaller size that at least correspond to the size of the metal to be then removed. The friable portions of the mass are then broken up into a size smaller than that of the metal to be removed, metal of progressively smaller sizes being selectively removed and by-passed by the impacting passages by size separating it from the friable portions of the mass, and during the processing, progressively magnetically separating lower and non-magnetic from higher magnetic materials of the mass.—2,971,703.

### Resistance Heating Process and Apparatus

A process for resistance heating elongated electrically conductive workpieces such as steel billets and other similar semi-finished members to a substantially even elevated temperature throughout the entire workpiece, comprises the steps of applying a pair of contacts to the ends of the workpiece and conducting a high current through the same in order to heat the workpiece rapidly, whereby more heat is developed in end portions of the workpiece located adjacent the contacts than in commensurate portions of the workpiece which are farther distant from the contacts. A cooling fluid is applied to the end portions of the workpiece at least during a part of the time that it is heated by the passage of current therethrough so as to absorb a portion of the heat developed in the end portions and to cool the same sufficiently to substantially maintain an even temperature throughout the entire length of the workpiece.—2,972,043.

### Tube Mill and Pressure Control Therefor

In an electric resistance tube mill having a rotary transformer and a pair of welding electrode wheels supported in vertically disposed relation with respect to a path of strip travel, means are provided for vertically moving the transformer and welding electrode wheels, and for controlling vertical movement, said means of control comprising also means responsive to the force exerted on the side edges of a tube length by the electrode wheels.—2,972,039.

## *Brown-Bingham Pump*

DOUBLE-VOLUTE centrifugal pump which has recently gone into production at Penistone, Sheffield, was shown for the first time at the Engineering Exhibition in London. It is representative of a new range of products introduced as the result of an agreement between David Brown Industries, Limited, and the Bingham Pump Company, of Portland, Oregon, USA.

The pumps are of the horizontal single-stage type and are claimed to be unique in that the hydraulic pressure in the pump case is balanced at all diametrically opposite points around the periphery of the impeller throughout the pump's operating range.

Unbalanced force acting radially against the impeller can be of sufficient magnitude to deflect the rotating element from its true position in the case, causing excessive wear and creating other running problems. Attempts to balance pressure by the use of staggered volutes have met with difficulty because of the number of external cross-overs required when the number of stages is increased.

Such defects are overcome in the David Brown-Bingham pump by making the double volute case in the form of two exactly similar volutes, each spanning half of the impeller circumferences. At any two points on opposite sides of the impeller, the shape and area of the adjacent casing and the velocity of flow therein are respectively equal. By virtue of this design, hydraulic pressure, acting radially against the impeller at any point, is balanced by an exactly equal pressure acting against the opposite side of the impeller—regardless of head, capacity, or speed at which the pump is operating.

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OUTPUT OF rolled products in West Germany in March rose to 2,001,000 tons, an increase of 10 per cent. on the February figure of 1,814,000 tons. The increase is attributed to the greater number of working days (26.5 compared with 24). The daily average fell slightly to 75,495 (75,691) tons.

# Self-advancing Roof Support

## *For Plough Faces*

RECENT trends in the coal industry's quest for increased efficiency by mechanization indicate a growing application of coal ploughs. This method of winning coal and loading it onto the face conveyor overcomes many of the problems associated with some other forms of power loading. The all-important problems of maintaining the size of the product, the ability to negotiate gradients, and the application of the plough to thin seams have enhanced the future of coal production by ploughing.

Although changes have been made recently in the design of coal ploughs, part of the successful application of this form of mechanization can be attributed to its use in conjunction with self-advancing roof supports, incorporating conveyor rams to provide more positive bearing forces to hold the plough blade to the coal.

The application of self-advancing roof supports to plough faces requires a slightly different technique from that required for other forms of power loaders with a measured depth of cut. It is essential to have a more flexible method of supporting the roof to follow the advance of the thin-slice machines. It is mainly for these reasons and the necessity to reduce the capital cost of self-advancing roof supports that Dowty Mining Equipment, Limited, Ashchurch (Glos), developed the Roofmaster Minor as a complement to the Dowty Roofmaster. The Roofmaster Minor powered support system is designed for application with both medium-cut or thin-slice machines, and can be used in thin, thick, or inclined seams.

The new system incorporates a simplified version of the proven Roofmaster props, bend-proof top beams and bases. The support units, shown fitted with waste shields in Fig. 1, consist basically of two sledged box-section bases fitted to two props carrying a top beam to support the roof. The beams are mounted on the props by pins in spherical seatings which permit the beams to roll 5 deg. either side of the vertical.

Two resilient spring-steel cross members connecting the support units at the front and rear give flexibility to the system, so that it can accommodate irregularities in the roof and floor. The cross members allow for a total vertical displacement of 8 in. The front cross member consists of four spring-steel leaves bolted to brackets integral with the bases; the rear member is a spring-steel leaf retained by pins between the rear props and roof beams for freedom of movement.

The mounting of the jack for advancing the conveyor has been designed so that it is free to cope with floor irregularities and at the same time has self-steering properties when ramming over the conveyor. The jack, which can be single or double acting, as required, is in the centre of a yoke attached to the bases. The ends of the yoke are connected to points near the front of the bases by pivoted links to permit up and down movement, while the jack is retained in the yoke by a vertical pin for horizontal pivoting. The jack is connected mechanically to the conveyor and hydraulically to the operating system.

The mounting arrangement provides only a small amount of movement of the conveyor in relation to the front row of supports when the system is applied to a trepanner or a shearer, but for plough working a degree of play, amounting to a maximum of 10 in., allows the conveyor to "float" (Fig. 2).

Prop and jack valves are mounted adjacent to the front prop and are operated by detachable lever handles. This feature is a safety measure to eliminate accidental shifting of the controls. Rigid steel pipe connects props and jack-control valve to prop control valve, while

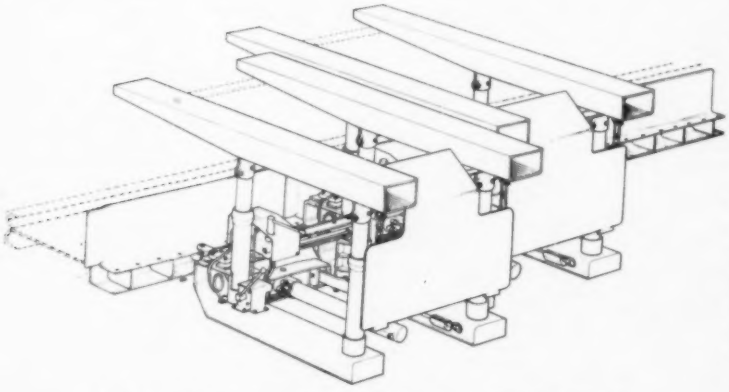

FIG. 1.—ROOFMASTER MINOR FITTED WITH WASTE SHIELDS.

flexible hose connects jack control valve to jack. This ensures that roof loading pressure is not carried by flexible hose.

The fluid used in the system is a non-inflammable water/soluble oil emulsion, and the pressure is maintained by a standard three-throw ram pump situated in one or both of the gate roadways. A pressure of 1,000 lb./sq. in. is used for both prop setting and conveyor advancing when the system is applied to trepanner or shearer faces; when the system is used in conjunction with a coal plough, an extra valve provides a resilient pressure between 250 and 500 lb./sq. in. in addition to the standard prop-setting pressure of 1,000 lb./sq. in.

The overall design of the Roofmaster Minor has been planned to give a protected and unobstructed travelling way through the face and to cater for seam heights from 2 ft. 6 in. to over 6 ft. It is claimed that the high degree of flexibility given to the system by the resilient connectors, plus the overall width of each unit of 3 ft. 8 in., ensures stability in inclined seams at gradients up to 1 in 7 even where floor irregularities exist.

To facilitate carriage and installation, the powered roof support can be broken down into five component parts, consisting of two top beams, two bases, complete with props, and the jack and its mountings; the heaviest item weighs 300 lb.

Two trial installations, one at Bold Colliery, in the North-Western Division, and the other at Dalkeith Colliery, in the Scottish Division of the National Coal Board, have recently been completed to test the pit worthiness of the system. At Bold Colliery the installation is operated in conjunction with a shearer loader, and at Dalkeith the supports are being used in association with a coal plough.

The Dalkeith Colliery trials are to include the testing of a fully automatic system of advancing the supports.

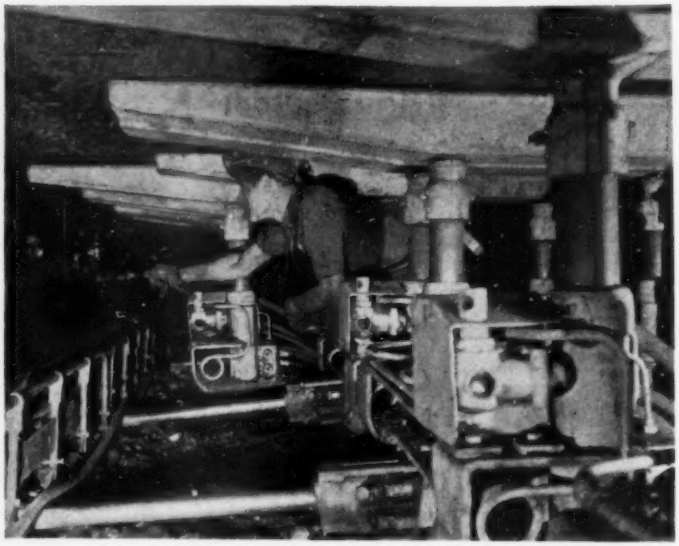

FIG. 2.—ROOFMASTER MINORS AT A PLOUGH FACE, SHOWING THE SPACE BETWEEN THE ADVANCED SUPPORTS AND THE CONVEYOR TO ALLOW MOVEMENT DURING THE PASSAGE OF THE PLOUGH.

# Servicing of Dust Respirators

SITUATIONS are sometimes found at collieries where the respirable airborne dust cannot yet be brought within the approved limits by conventional dust suppression measures. In such circumstances dust respirators can assist in reducing the pneumoconiosis risk; but respirators, to be effective, must remove a high percentage of the respirable dust, must not interfere with breathing, and must be reasonably comfortable to wear. It is therefore important that a high standard of respirator maintenance should be provided.

During 1958, the Ministry of Power introduced testing procedures for dust respirators, to test particularly their filtration efficiency and resistance to breathing. On the results of such tests the Ministry issues appropriate certificates for approved respirators. The National Coal Board has also established an approval procedure which requires that only dust respirators certified by the Ministry and complying with NCB specification P. 156/1958 can be purchased for use at collieries.

When the Ministry approval system was established, information was still lacking on servicing procedures appropriate to practical mining conditions. In particular, the period taken for dust to clog the filters and cause undue resistance to breathing was unknown. This information has since been obtained from the divisions. Towards the end of 1959, one set of apparatus to test the breathing resistance of respirators was issued to each of eight divisions with the request that it be sited at a colliery using an appreciable number of NCB approved respirators. The resistance of the respirators was to be checked repeatedly, both before and after servicing, and standard records maintained. The results of such testing and servicing form the basis of Information Bulletin 61/222, recently issued by the production and reconstruction department of the NCB.

# *New Literature*

CATALOGUES, house magazines, booklets, and other publications received include those referred to below. Readers wishing to obtain a copy of any of the items should write to the address given, at the same time mentioning this journal.

ELECTRICAL APPARATUS COMPANY, LIMITED, St. Albans (Herts)—Oil-immersed starters, type QOD, with the tank located within the main enclosure, are described in illustration sheet 144.

DAVID BROWN TRACTORS, LIMITED, Meltham, Huddersfield—Tractor News is a four-page newspaper packed with interesting stories and news items concerning the David Brown group. The May issue is now available.

FOSECO, LIMITED, Drayton Manor, Tamworth (Staffs)—"Blisters in Rolled Silver-copper Sheet" and "Impurities in Gunmetals" are the main articles in the April issue of Foundry Practice. Foundry Services, Limited, became known as Foseco, Limited, as from May 1.

GENERAL REFRACTORIES, LIMITED, Genefax House, Sheffield 10—Publication No. 129 deals with "Ramag," a high magnesia ramming composition composed entirely of magnesia and specially designed for the working bottoms of electric arc and open-hearth steel melting furnaces.

SIMON-CARVES, LIMITED, Cheadle Heath, Stockport—The Grange coking plant of the Steel Company of Wales, Limited, built by Simon-Carves, was described in articles in the February and March issues of Coke and Gas. These have been reprinted and bound in an attractive cover by Simon-Carves.

MONSANTO CHEMICALS, LIMITED, Monsanto House, 10-18, Victoria Street, London, S.W.1—The latest issue of Monsanto Mail (No. 7) is now available. Unfortunately, circulation of this magazine is restricted and the publication is not necessarily obtainable for the asking. Many aspects of the company's activities are brought out in a series of interesting articles.

GEORGE KENT, LIMITED, Luton (Beds)—Published "as a contribution to the science and art of industrial instrumentation," the Instrument Engineer (2s. 6d.) is a valuable addition to the literature available in this field. "Heat Meter for the Hot-water Boiler," by D. E. Harvey, of the company's contracts department, is among the contents of the April issue.

NATIONAL UNION OF MANUFACTURERS, 6, Holborn Viaduct, London, E.C.1—The business executive will always find much to interest him in the British Manufacturer (2s.), published monthly. The May issue follows the usual pattern of publishing articles of topical interest by experts and news items and notes on the activities of the various branches of the NUM.

FIRTH-VICKERS STAINLESS STEELS, LIMITED, Staybrite Works, Weedon Street, Sheffield 9—Enchiridion is the title of an elegant magazine published by the company. The theme is to impress upon the reader the fact that "Staybrite" steels provide lasting beauty in the home and faithful service to science and industry. Examples of the uses of "Staybrite" are put over in a very readable way, while the art work in the publication is of a high standard.

ALUMINIUM DEVELOPMENT ASSOCIATION, 33, Grosvenor Street, London, W.1—Contents of the March issue of the Aluminium Courier, the association's quarterly (2s. 6d.), include "Aluminium in Insulated Power Cables," "Metallurgy—a Science and a Technology," "Churches—Architecture and Furnishings," and "Free-machining Aluminium" (in the "Aluminium in Practice" series). All the articles are attractively illustrated and presented.

WILLIAM G. SEARCH, LIMITED, Whitehall Road, Leeds 12—This firm of contractors' plant specialists, machinery merchants and valuers, etc., has produced an attractive brochure outlining its activities. There are many aspects to the business. A large and comprehensive hire fleet operates in the West Riding and further afield, supported by a staff of trained service engineers. Another department deals exclusively with machinery. The brochure gives full details of these and other activities.

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED, 33, Grosvenor Place, London, S.W.1—Welding reactions are basically the same as those of steelmaking, but the conditions under which they occur are rather different; by their very nature, these conditions are difficult to investigate experimentally. J. C. Fitch, of AEI transformer division's heating and welding department, writing in the May number of AEI Engineering, after considering the basic features of the welding arc and the problems which they pose, discusses various developments of importance in modern welding practice. Other articles in the issue include "The AEI Propulsion System for the Liner Canberra," "Sea Trials for the Laying of the Cross-Channel Power Cable," and "Air-blast Circuit-breakers for New South Wales."

## Electrical Equipment for Spain's Newest Steelworks

SPAIN'S newest steelworks, known as Empressa Nacional Siderurgica, S.A. (Ensidesa), has ordered over £1,000,000 worth of electrical equipment from the United States for a cold-rolling unit as part of a programme to make its plant an integrated operation. The order includes main drive motors totalling 15,100 h.p. and motor-generator equipment totalling 18,150 h.p. plus controls, according to Westinghouse International. Delivery is scheduled to begin in the third quarter of this year.

Main drives for the equipment consist of five motors ranging from 1,000 to 3,500 h.p. for a four-stand tandem cold mill, one 1,500-hp. motor for a temper mill, and a group of motors totalling 1,100 h.p. for a pickling line.

Located at Aviles in northern Spain, Ensidesa began operations in late 1958 and is carrying out its integration programme with the aid of financing from the Export-Import Bank of Washington. The Ensidesa programme will enable the steel concern to turn out cold-rolled flat steel to meet a steadily growing domestic demand. The cold-rolling facility is scheduled for operation in late 1963.

NO DECISION on the setting up of a large-scale iron and steel industry in New Zealand is likely to be made for at least six months. The American project engineers to the New Zealand Steel Investigating Company state that it will take a few months for them to complete their report.

# Developments in Ship Design

A CONSIDERABLE drop in plans of new construction approved was referred to in the annual report of Lloyd's Register of Shipping for 1959, but last year's report, recently issued, states that this fall has been checked. The gross tonnage of new ships represented in the plans approved during the 12 months ended June, 1960, amounted to over 2,700,000 tons, an increase of more than 200,000 tons compared with the previous 12 months. Oil tanker tonnage was only one third of the total submitted.

One feature of the plans of new construction examined has been the large number of single-deck bulk carriers, and, in addition, plans for over 20 conversions of tankers to bulk carriers were received. The large bulk carriers employed for transporting ore, coal, and grain, on the Great Lakes have hitherto been built at American or Canadian Lake ports, but the opening of the St. Lawrence Seaway means that this is no longer obligatory. These ships are of unusually small depth relative to their length, which is over 700 ft., and special precautions will be necessary to enable any built in Europe to undertake the delivery voyage across the Atlantic. This question has been investigated because plans for several of these ships have been submitted. The problems have now been solved and the plans approved. The tendency towards the large bulk carrier continues, and plans for ships of this type carrying up to 47,000 tons deadweight have been approved. One which is 200 ft. long and 10 ft. dia. is now being constructed under survey.

An interesting conversion is that of a 10-year old tanker Gyrotonia, now to be called Shell Murachi. This ship will carry liquid propane in 22 steel pressure vessels of 12 ft. and 14 ft. dia., weighing up to 37 tons each. These will carry 747 tons of the liquid propane and, in addition, 5,671 tons of oil will be loaded in wing tanks and in the remaining tank space around the gas bottles. The carriage of liquid chemicals such as sulphuric acid, nitric acid, chlorine, etc., in bulk has begun to interest some shipowners. Some of the cargoes require to be carried in pressure vessels and others in stainless steel tanks, and the Society has investigated these matters in order to be able to advise interested owners of the requirements for these special cargoes.

## WORLD'S LARGEST BACKING-UP ROLL

THE Mesta Machine Company, makers of heavy rolling mill and other steelworks equipment, has recently produced a 29-ft. backing-up roll for use in what is claimed to be the world's largest plate mill being built for the Gary Works of the United States Steel Corporation.

The roll, which is 72 in. dia., was forged from an ingot of special alloy steel weighing roughly 500,000 lb. being cast at the Mesta open-hearth furnace plant at Pittsburgh. This mill, it is reported, will be able to roll plates either 160 in. or 210 in. wide.

THE INCANDESCENT HEAT COMPANY, LIMITED, has installed four Incandescent-Whiting dust arrester units at the works of R. J. Hunt & Son, Limited, three for the Midland Motor Cylinder Company, Limited, two for the Austin Motor Company, Limited, and two for David Caird, Limited.

## "Terylene" Ducting at Ironstone Mine

IN experimenting with a trial quantity of p.v.c.-coated "Terylene" ventilation ducting at its ironstone mine at North Skelton (Yorks), Dorman Long (Steel), Limited, found that it is considerably lighter in weight than the jute or canvas now being used, and is therefore easier to handle.

The ducting is similar to that being used by the National Coal Board and was made by Robert Watson & Company, Limited, Newburgh (Fife).

## *Obituary*

# MR. JAMES TENNANT

## Chairman of Scots Steel Roll Manufacturers

NOTED industrialist and chairman and managing director of R. B. Tennant, Limited, makers of cast steel, steel base and alloy steel rolls, etc., of Coatbridge (Lanarkshire), Mr. James Tennant died in Glasgow last week at the age of 75. President of the West of Scotland Iron and Steel Institute from 1943-45, he was for the past 40 years associated with major advances in the production of rolls for the steel industry in this country and oversea.

He entered the firm, founded by his grandfather in 1857, as a boy of 14 in 1900, becoming foundry manager in 1910, managing director in 1921 and chairman in 1948. Since 1921 he has directed the technical advances which have enabled the firm to keep pace with the needs of the UK steel industry, so that today it is the largest single producer of cast steel and steel base rolls, supplying half the requirements of the UK, while exporting a quarter of its production.

During the depression of 1926 and after, Mr. Tennant modernized and rebuilt the works, travelling in America, Germany and other countries to ensure that his foundry was up-to-date. After a further visit to the US in 1935, he linked up with a roll foundry in Pittsburgh and introduced to Britain the new alloy "Adamite," which revolutionized roll production and enabled the steel industry to meet the demands of the war from 1939 onwards. Before his death he was planning further expansion and technical advance, with the aim of doubling the company's output by 1970.

A former Provost of Coatbridge, he was appointed a JP in 1936 and Honorary Sheriff Substitute for Lanarkshire in 1942. He was also a past president of Airdrie Savings Bank, and Commandant of Coatbridge Special Constabulary during the war.

### MR. R. J. GLINN

THE death took place last week of Mr. Roy James Glinn, a former senior executive of Babcock & Wilcox, Limited, until his retirement six years ago. After graduating at University College, London, with a first-class honours in mechanical engineering, he joined Babcock & Wilcox and was active in the development of pulverized coal-firing for steam generation purposes. He became well known for his outstanding work in boiler feed water chemistry.

Mr. Glinn was a member of the Admiralty Committee on Boiler Corrosion and of the Industrial Water Committee of Investigation set up by the British Iron and Steel Research Association. He also served on a number of committees of the British Standards Institution.

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Chairman and managing director of F. Parramore & Sons (1924), Limited, ironfounders, etc., of Sheffield, Mr. ERNEST PARRAMORE has died at the age of 71. He was a son of the founder of the company.

Mr. R. B. FULTON, who retired five years ago as under manager of East Hetton Colliery (Co. Durham), has died at the age of 67.

Former surveyor for Vulcan Boiler & General Insurance Company, Limited, Manchester, Mr. THOMAS BARRON has died aged 76.

The death has occurred, as the result of a road accident, of Mr. JAMES D. BALLANTINE, ironfounder, of Bo'ness (West Lothian). He was 80.

Mr. JOHN MUNRO HUNTER, managing director of the family business of A. & J. Hunter, Limited, ironfounders, of Ayr, has died aged 57.

Fire officer at Pleasley Colliery, Mansfield (Notts), Mr. JOSEPH BONSER, has died at the age of 64. He was a former cadet superintendent of the St. John Ambulance Brigade.

The death has occurred of Mr. NOAH ROBINSON, joint managing director of the Willenhall Motor Radiator Company, Limited. He had been associated with the company for 39 years and was appointed to the board in 1950.

The death has occurred of Mr. FREDERICK BUCKLAND PERRY, a director of Robey & Company, Limited, engineers and boiler manufacturers, etc., of Lincoln. Mr. Perry, who had served with the company for 53 years, was for some years a member of the various technical committees of the British Standards Institution.

Mr. WILLIAM HALL, manager of Whitwick Colliery (Leics) for 20 years until his retirement in February this year, has died at the age of 65. A past president of the South Midland branch of the National Association of Colliery Managers, he began his career as a boy at the old Ibstock Colliery and for his services to the mining industry was made MBE.

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## *More Days Lost by Industrial Disputes*

DISPUTES in coal mining, shipbuilding, and the docks largely accounted for a rise of about 50 per cent. in the number of working days lost through strikes in the first four months of this year, compared with the same period in 1960. By the end of April, 1,403,000 working days had been lost, compared with the figure of 994,000 for the same period last year, according to statistics published in the Ministry of Labour Gazette.

Miners have the worst record with an increase from 174,000 to 522,000 days lost, while workers in shipbuilding lost 277,000 days compared with 92,000 last year.

# Improvement in Output of Iron Castings

PRODUCTION of iron castings in the first quarter of 1961 was 1,026,130 tons, compared with 1,032,860 tons in the first quarter of last year, it is announced by the Iron and Steel Board. Outputs in the various districts, with the figure for the first quarter of 1960 in parentheses, were: Eastern, South-Eastern (including London), Southern and South-Western, 115,620 (119,610) tons; Midland, 229,320 (229,540) tons; North Midland, 203,780 (223,060) tons; East and West Ridings, 95,400 (94,830) tons; North Western, 100,100 (97,810) tons; Northern 114,550 (110,560) tons; Scotland and Northern Ireland, 98,650 (91,160) tons; Wales, 68,710 (66,290) tons.

Commenting on the Iron and Steel Board's announcement, the Joint Iron Council states that the ironfounding industry made an excellent beginning to 1961. At the end of 1960 ironfoundries were operating at a high and rising level of production, the salient exceptions being those affected by the recession in the automobile industry. It was therefore particularly encouraging to note the improvement in this section during the first three months of the year.

Total output of iron castings in the first quarter of 1961, at 1,026,100 tons, compared with 1,024,700 tons in the previous quarter. Outputs in the various industrial sections in the quarter, with the percentage increase or decrease over the previous quarter in parentheses, were: automobile (including tractors), 186,300 tons (+2.5 per cent.); engineering (including machine tool, textile machinery, electrical, shipbuilding, etc.), 342,300 tons (+0.9 per cent.); building and domestic, 151,000 tons (+1.5 per cent.); pressure pipes and fittings, 135,300 tons (−3.5 per cent.); ingot moulds (mainly for the steel industry), 138,200 tons (−4.5 per cent.), and railway equipment, 73,000 tons (+4.0 per cent.).

Althought output in the automobile ironfoundries during the first quarter did not rise to the very high peak of the corresponding period of last year, says the Joint Iron Council, it should be borne in mind that the improvement in conditions in the automobile industry itself was confined to the latter weeks of the quarter. At the end of the period, this section of ironfounding was operating at close to record rates of production. The consistent flow of orders reaching the engineering trades as a result of the gathering momentum of manufacturing industry's investment programmes was reflected in the engineering section, where output again edged forward in all but marine and some branches of heavy engineering.

The building section, as heavily dependent on public as on industrial investment, increased its output by a significant margin although the output of castings for domestic goods remained unchanged. The contraction of ingot mould output is explained by the slight easing of the steel industry's rate of production, while the phasing of railway track construction and improvement work lies behind the increase in the railway equipment section.

The number employed in the ironfounding industry at the end of March, 1961, was 131,800. This is 400 more than three months ago and 2,300 more than at the end of March, 1960.

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HUNDREDS OF CATHOLICS who form a large part of the labour force engaged in the construction of Spencer steelworks at Llanwern now have their own church near the site. It was dedicated on Sunday evening.

# Simon Engineering Chief on "Success of Merger"

MOST trading departments of Simon Engineering, Limited, have increased order-books and generally are dealing with a record number of inquiries, says Mr. R. B. Potter, chairman, in his annual statement. The indications are that the 1961 results will be about the same as those for 1960, although it is a little early, he points out, to make a positive forecast especially as it will be the first full year of the combined companies. A merger of the company, formerly Henry Simon (Holdings), Limited, with Simon-Carves, Limited, became effective last July.

Mr. Potter says that he has every confidence in the continued success of the group. The merger had been successfully accomplished, and there was undoubted evidence that benefits would be increasingly important. "We have now an engineering group which is exceptionally, perhaps uniquely diversified; this diversification should result in a more even flow of profits than has been experienced by either of our main constituent companies, as we are now less dependent on particular sections of the engineering world."

As a large proportion of the work is for export, the future success could be affected by Government policy towards long term credits and the difficulties that might arise as a result of the Common Market. The directors, he says, are at present carrying on important negotiations with the USSR.

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# *GKN's £8,000 Technical Training Centre Opened*

AT its technical centre, which was inaugurated last week in Smethwick (Staffs), the screw division of Guest Keen & Nettlefolds (Midlands), Limited, has also established its own school, which will deal with the specialized subjects of the theory and practice of fastening and is designed to see that the firm's student and graduate apprentices are more knowledgeable than their predecessors. It is also intended to run courses for supervisors, salesmen, and distributors.

Managing director of the screw division, Sir Anthony Bowlby, said, "We hope in time to bring this centre to such a level that customers among large industrial concerns will want to send their craftsmen on one of our courses."

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# HAND TOOL MANUFACTURERS URGED TO INCREASE EXPORTS

MEMBERS of the Federation of British Hand Tool Manufacturers were urged at their annual meeting in Sheffield to make an "all out" effort to increase exports. Mr. J. Hugh Neill, retiring president, deplored the tendency which he said existed, in some quarters to say: "I am already doing a good job, and exhortations to export more do not apply to me."

Mr. Neill, who is deputy chairman of James Neill & Company (Sheffield), Limited, a former Master Cutler, and a member of the Export Council for Europe, maintained that "Everyone can export more." While recognizing that the firm which was not yet exporting could now make a contribution to the export trade, the country's balance of payments position could only be righted by a major contribution by firms who already conducted a reasonable export trade, he said.

## *Company News*

# ENGLISH ELECTRIC OFFER

## For Share Capital of Stafford Engineers

OFFER worth just over £2,000,000 for the entire share capital of W. H. Dorman & Company, Limited, Stafford, has been made by the English Electric Company, Limited. W. H. Dorman, which was registered in 1897, makes high-speed oil engines for marine and industrial applications and diesel-engined generating sets and also operates as ferrous and non-ferrous founders. Its directors have decided to accept in respect of their own holdings and will recommend acceptance to other holders. Formal offers are to be posted as soon as possible.

English Electric is offering 11 £1 ordinary shares for every 20 of W. H. Dorman's 250,000 11 per cent. non-cumulative preference 10s. shares, five £1 ordinary for every 14 of the 592,000 2s. Dorman ordinary shares, and one £1 ordinary for every four of the 2,330,000 2s. "A" ordinary shares.

English Electric, which is engaged on a wide range of electrical activities, has big interests in diesel engines and locomotives and its Stafford works are adjacent to those of W. H. Dorman. The latter company acquired W. G. Bagnall, Limited, Stafford diesel and steam locomotive builders and railway and general engineers, in January, 1959.

## Hadfields Accepts New Shares Offer

OFFER of an industrial and financial group to subscribe 2,616,184 new ordinary shares of £1 each at par was accepted at an extraordinary general meeting last week of Hadfields, Limited, the Sheffield steel manufacturing and engineering group, despite objections from a small group of shareholders. The offer will increase the group's issued ordinary capital to £6,300,000. The subscribing group is headed by Sir Peter Roberts, MP, chairman of the Wellman Smith Owen Engineering Corporation, Limited, who will become vice-chairman of Hadfields, and the other industrial members of the group are Newton Chambers & Company, Limited, and Barrow Barnsley (Holdings), Limited.

Lord Dudley Gordon, the chairman, announced that 3,856 proxies representing 1,176,000 shares had voted in favour of the move and 399 representing 116,086 against. He said he wished to make it clear that the approach had come from the group and not from the firm. The money would provide additional funds required to finance the future progress of the company. The firms in the group were not competitors of Hadfields.

## Enfield Rolling Mills and Delta Metal Merger

UNDER a deal announced last Friday, Enfield Rolling Mills, Limited, refiners and rollers of non-ferrous metals, of Brimsdown (Middx), and the Delta Metal Company, Limited, metal manufacturers, etc., of London, S.E.10, and Birmingham, are to merge their rolled copper and brass sheet and strip interests from July 1. A new company—Delta Enfield Rolled Metals, Limited—will acquire and carry on the combined undertakings and the share capital of this company will be held in equal proportions by the two principal companies.

Production is to be continued at Enfield's Brimsdown works and at the works of Delta Metal at Birmingham. Main object of the merger is to strengthen the two businesses and give better production facilities. None of the principal companies' other activities is affected by the deal, nor does it involve the issue or transfer of any of their shares.

LAMBERT BROS., LIMITED, shipbrokers, coal exporters, of London, E.C.3.—Final dividend of 17½ per cent. for the year ended 31 December, 1960, is recommended, making a total of 25 (22½) per cent. Net profit for the year is £284,726 (£244,159).

GEO. W. KING, LIMITED, mechanical handling engineers, etc., of Stevenage (Herts)—Dividend for 1960 is being maintained at 12½ per cent. and the directors forecast that the rate will be repeated for 1961 on capital to be increased by a one-for-three rights issue. At 12s. 6d. per 5s. share to holders registered on June 12, the rights issue will raise about £500,000. Net profit for the year increased to £143,120 (£133,858) after tax of £137,740 (£132,355). It is proposed to increase the authorized capital to £1,250,000 by the creation of 1,000,000 5s. ordinary shares to provide for the issue.

COLEY METALS, LIMITED, metal merchants, etc., of London, E.C.2.—During the year to January 31, 1961, expansion developments resulted in an increase in the group overdrafts from £71,265 to £541,152 and, says the chairman, Mr. R. W. Coley, the directors are giving "serious consideration" to the raising of additional permanent capital in the foreseeable future.

DARNALL INDUSTRIES, LIMITED, manufacturers of mining equipment, valves and springs, etc., of Sheffield—Group net profit for the year is £150,580 (£141,854) after tax of £113,378 (£117,258).

NORTH BRITISH LOCOMOTIVE COMPANY, LIMITED, Glasgow—The group has reduced its net loss, including contract losses provisions, from £1,349,566 for 1959 to £467,682 for 1960. There is again no dividend on the ordinary or preference issues.

BIRMINGHAM SMALL ARMS COMPANY, LIMITED—With the announcement of a 4 per cent. interim for the year to July 31, 1961, the directors say they expect profits, including the post-acquisition profits of the Churchill Machine Tool Company, Limited, to be about £3,000,000 (£3,400,000). Although turnover for

the group in the first nine months of the year exceeds last year's similar period, costs of production have caused some reduction in profit margins. Adjusting for a one-for-two scrip issue, the interim is equal to the 1959-60 actual 6 per cent. payment.

FIRTH CLEVELAND, LIMITED—An increase in profit from £2,129,838 to £3,025,153 for 1960 is reported, and the company is paying a final dividend of 20 (17½) per cent., making a total of 32 (27½) per cent. Taxation absorbs £1,361,921 (£928,825), leaving a group net profit of £1,663,232 (£1,201,013).

COALITE & CHEMICAL PRODUCTS, LIMITED—Group profits for the year ended March 31, 1961, fell from £935,913 to £852,133, and after tax of £403,050 (£434,916) the net profit of £449,083 compares with £500,997. A final dividend of 6 per cent. maintains the previous year's 11 per cent. equivalent.

CRANES (DEREHAM), LIMITED, steel wheel and axle manufacturers, trailer builders, etc., of Dereham (Norfolk)—Final dividend of 17½ per cent. makes 22½ (20) per cent. for the year ended March 31, 1961. Net profit was £57,751 (£39,741), after tax of £8,250 (£4,500), but before transfer to reserve for future tax of £24,760 (£13,507).

BRITISH INSULATED CALLENDER'S CABLES, LIMITED—Offers to acquire the first and second preference stock and all the ordinary stock not already held in Thomas Bolton & Sons, Limited, have been accepted by more than three quarters in number and 90 per cent. in value of the holders of such stocks, and are now unconditional. Acceptances will be received until further notice.

ELLIOTT-AUTOMATION, LIMITED—The group has acquired 2,568 shares of NF50 of La Thermostatique, SA, the French subsidiary of the Rheostatic Company, Limited, a member of the Elliott Automation group, in exchange for the issue of 17,120 ordinary 5s. shares each in Elliott Automation. This increases the group's holding in the French company from about 67 per cent. to just over 75 per cent.

ALLEN WEST & COMPANY, LIMITED, electric control and switchgear manufacturers, of Brighton (Sussex)—The directors have decided to make a one-for-10 rights issue to those registered on May 31 at a price yet to be determined. At the present time the company has more work on its books than ever before, but Budget provisions and the new fuel oil tax will increase costs of production and associated services.

TURNER & NEWALL, LIMITED, manufacturers of asbestos and allied products, of Manchester—The board considers trading results for the first half of its current year have been satisfactory and expects similar conditions to continue for the remainder of the year. To reduce disparity between interim and final dividend rates, the interim for the year to September 30, 1961, is raised from the equivalent of 2½ per cent. to 4 per cent.

BUTTERLEY COMPANY, LIMITED, bridge builders, general engineers, ironfounders, etc., of Derby—The company announces a capital distribution, not subject to tax, of 8d. per 2s. 6d., share, making a total from this source of 1s. for 1960, against 9d. for 1959. Group profit for the year increased to £180,324 (£113,538) after tax of £29,660 (£10,111 credit).

S. RUSSELL & SONS, LIMITED, ironfounders, and mechanical and structural engineers, of Leicester—Profit to March 31, 1961, rose from £158,089 to £200,171, subject to tax of £94,293 (£71,897), and a final dividend of 10 per cent. makes 15 (12½ equivalent) per cent. for the year. In view of impending rebuilding of older properties and the installation of new melting fires to increase production a one-for-four rights issue of 374,000 ordinary 5s. shares at 6s. per share is proposed.

ASSOCIATED PORTLAND CEMENT MANUFACTURERS, LIMITED—Dividend for 1960 is being effectively raised to 12½ (11) per cent. with a final of 8½ per cent. Following a revaluation, a one-for-two scrip issue is proposed. Net profit for the year is £59,692,756 (£5,590,098). At the annual meeting on July 25, it will be proposed that the authorized ordinary capital be increased from £30,000,000 to £45,000,000 and that £13,559,900 of reserves will be capitalized. New ordinary will be allotted to those registered on July 26. This capitalization, state the directors, does not carry any implication that the total to be distributed by way of future dividends will be any greater than if the capital had not been increased.

HARLAND & WOLFF, LIMITED—With world shipbuilding capacity exceeding foreseeable demand for some time ahead and many contracts being placed at unremunerative prices it was "difficult to hold out an early prospect of a substantial recovery in profits available for distribution," Mr. J. S. Baillie, deputy chairman, said at the annual meeting. The company, however, had faith in the future and was continuing to use every endeavour to reduce costs and improve the efficiency of the undertakings with the acquisition of modern machinery and the adoption of new techniques.

SHEFFIELD TWIST DRILL & STEEL COMPANY, LIMITED—With a final of 16¾ per cent., dividend for 1960 is being raised to 25 (18¾) per cent. Group net profits advanced to £335,617 (£240,845) after tax of £362,522 (£276,233) from which is deducted a profit of £22,026 (nil) not now consolidated. All the share capital of the subsidiary, Accurate Screw Threads, Limited, was sold as from January 1, 1960, and its trading results are not included. On August 19 all the share capital of Johnson Bros. (Taps & Dies), Limited, and that of Johnson Bros. (Ground Threads), Limited, were acquired and these two subsidiaries are included from the date of the acquisition.

TILLEY LAMP COMPANY, LIMITED, manufacturers of pressure lamps, radiators, etc., of London, S.W.1—The directors say that to continue to manufacture at the works at Hendon would be no solution to the company's present difficulties and production is therefore to be transferred to a new factory in Ulster. It is considered unlikely that any payment on the ordinary capital will be paid for at least five years, but they expect the company will be in a position to commence to deal with the arrears of preference dividend in about three years. The preference dividend is paid to September 30, 1958, while the last ordinary payment was a 10 per cent. interim for the year to March 31, 1957.

## Bid By Delta Metal for Davis & Timmins

SHARE exchange offer for the ordinary capital, other than that already owned within the group, of Davis & Timmins, Limited, makers of automatic screw machine products, of London, E.17, is proposed by the Delta Metal Company, Limited. The offer is two Delta 5s. ordinary shares for each Davis & Timmins 5s. ordinary shares, ex the final dividend but cum the one-for-four scrip issue proposed in the 1960 report. Delta already owns about 18 per cent. of Davis & Timmins' present issued ordinary capital of £608,437.

The offer, which places a value of about £6,000,000 on the total Davis & Timmins equity, has been intimated to that company's chairman, and is subject to his board's approval and recommendation, which is expected to be announced at the annual meeting today (Friday).

# *IRON AND STEEL TRADE*

EASING up in placing forward orders for heavy steel products has enabled delivery dates to be shortened still further for most types of sections and so far as standard sections are concerned the position has been reached when rolling mills have not sufficient work to justify a weekly working schedule of 16 shifts. It seems obvious that much less steel is being ordered for stocking purposes and existing reserves are being readjusted.

### Pig-iron

Good outputs of pig-iron are being maintained, but unless consumers increase their specifications for steel products fairly soon, the contraction will quickly pass down the line of operations. The low phosphorus irons are being taken up in substantial quantities by the engineering and speciality foundries, but plentiful supplies are available.

There are no difficulties reported in obtaining requirements of hematite, the refined irons, and high phosphorus irons. Most producers have tonnages to spare and there is little forward buying by the foundries.

### Ferro-alloys

Ferro-tungsten is in steady request and there is a good demand for ferro-molybdenum and ferro-vanadium. Both the low and high carbon grades of ferro-chrome are active, and ferro-silicon is well supported.

Ferro-niobium is an active feature and there has been a reduction in price of 9d. per lb. Nb and Ta content. There is a reasonable call on ferro-titanium, and a fair demand for chromium metal.

### Semi-finished Steel

Most of the re-rollers are fairly well occupied, but business for many of their products has declined. The call for small bars and light sections continues steady but only at a moderate level and a much greater trade could be done in strip and bright drawn bars. Demand for reinforcing rods and bars shows no signs of falling off.

Plentiful supplies of mild steel semis are obtainable, home steelworks having tonnages to spare. Some easing in the position of carbon and alloy steel billets is reported and delivery dates are becoming more reasonable.

### Finished Steel

The steelworks are showing more sizes each week on their rolling programmes for sections and joists and demand is taking on a day-to-day aspect. Platemakers are increasing their outputs as more new plant comes into operation and, here again, delivery dates are easing.

Better business would be welcomed in cold reduced sheets and strip, flat and corrugated galvanized sheets, and good commercial quality bright drawn bars. Makers who specialize in colliery requirements are still finding orders well below capacity.

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DEMAND FOR LABOUR in Sheffield, which has been very high for several months, has increased recently. Figures issued by the Ministry of Labour last week showed that vacancies notified totalled 2,183 compared with 1,871, a month earlier. Of the vacancies, 844 were for women, the highest monthly figure for more than five years.

## Iron-ore Imports

IMPORTS of iron ore and concentrates (except chrome iron ore) and roasted iron pyrites in April, and the totals for the first four months of this year and last, are shown in the table below.

| From | Month ended April 30. | Four months ended April 30. | |
|---|---|---|---|
| | 1961. | 1960. | 1961. |
| | Tons. | Tons. | Tons. |
| Sierra Leone .. .. .. | 55,687 | 282,310 | 208,823 |
| Canada .. .. .. .. | — | 237,044 | 145,532 |
| Other Commonwealth countries and Eire .. .. .. .. | 1,002 | 12,063 | 4,242 |
| Sweden .. .. .. .. | 401,913 | 1,485,291 | 1,682,693 |
| Norway .. .. .. .. | 44,399 | 107,518 | 108,558 |
| France .. .. .. .. | 29,970 | 208,226 | 174,742 |
| Portugal .. .. .. .. | 18,098 | 125,557 | 101,281 |
| Spain .. .. .. .. | 59,902 | 270,097 | 282,456 |
| Algeria .. .. .. .. | 109,447 | 763,809 | 499,237 |
| Tunisia .. .. .. .. | 32,988 | 315,731 | 146,358 |
| Morocco (including Tangier) .. | 32,170 | 270,737 | 176,869 |
| Liberia .. .. .. .. | 53,670 | 176,320 | 145,002 |
| Venezuela .. .. .. .. | 180,713 | 560,491 | 776,789 |
| Brazil .. .. .. .. | 50,050 | 247,289 | 268,954 |
| Other foreign countries .. .. | 64,465 | 273,262 | 238,920 |
| TOTAL .. .. .. | 1,134,474 | 5,335,745 | 4,960,456 |

## FOUNDRY WORKERS TO SEEK 40-HOUR WEEK

MOTION calling for a "vigorous fight to be made for a 40-hour week now, without strings and any reduction in wages" was carried unanimously at the annual delegate meeting of the Amalgamated Union of Foundry Workers at Yarmouth on Monday. The motion said that the conference felt that with the Confederation of Shipbuilding and Engineers Unions having achieved the 42-hour week, a 40-hour week should be among the foremost of the union's claims.

The chairman, Mr. F. Hollingsworth, spoke of the effects of automation in bringing greater production with less labour, and of the need for higher wage rates and shorter hours.

The conference also approved a motion asking its executive to support the demand for a separate Trades Union Congress for Wales. A Welshman, Mr. E. Collins, said there were 500,000 trade unionists in South Wales. He was supported by a Scottish delegate, Mr. W. Mack, who said Scotland and Ireland had their own TUC's, and each nation had its own economic problems.

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MINISTRY APPROVAL has been given to the National Coal Board's application to mine coal from seams under Nottingham University.

## *Coalfield News*

COALFACE WORKERS at Woodside No. 3 pit, Shipley (Derbyshire), who staged a lightning strike on Monday over a wages dispute, went back to work on Tuesday, pending negotiations.

GOLDTHORPE COLLIERY, near Doncaster, which employs 420 men, reopened for work on Thursday of last week after being closed for six days because of underground flooding.

OVERALL PRODUCTIVITY in the Durham Division of the NCB in the 20th week of the year reached 23.45 (21.99) cwt. per manshift. At the face, productivity averaged 66.86 (64.26) cwt.

CLLR. TOM CHEETHAM, who has been appointed chairman of Maltby Urban District Council is the ninth successive chairman of the council to be associated with Maltby Colliery.

DERBYSHIRE AREA AGENT of the National Union of Mineworkers for the past 13 years, Mr. Michael Kane (64) is to retire in two months' time. His premature retirement is due to ill health.

ANNUAL FIRST-AID competition for the President's Cup of the St. Andrew's Ambulance Association was won in Glasgow on Saturday by Coatbridge Mines Rescue Corps. Twenty teams competed for the trophy.

TO MARK Commonwealth Technical Training Week in Mexborough (Yorks), a display of modern mining equipment by the NCB opened at the training centre, Manvers Main Colliery, on Monday. The equipment will be on show for a fortnight.

SURFACE WORKING of the recently-completed No. 3 shaft at the Rising Sun Colliery, Wallsend, and an exhibition of mining machinery have been on display to the public this week. Visitors also inspected the new Swedish-type 115-ft. high winding tower.

FIFTEEN MINERS at Ireland Colliery, near Staveley, Chesterfield, returned to work last Friday after a two-day strike over a wages dispute. A meeting of NUM officials and the pit management resolved several of the grievances, and others are to be discussed.

WINNERS OF A fire-fighting competition held at Coppice Area civil defence centre, near Heanor (Yorks) on Saturday were as follow:—Surface, individual, B. Meakin (Coppice Colliery); team, Moorgreen Colliery. Underground, individual, W. Raines (Moorgreen); team, Mapperley Colliery.

A ROOF FALL last week at Frances Colliery, Dysart (Fife), buried Mr. Michael Rodigan, but his workmates dug him out in 10 minutes. Last year, in the same section of the pit, a fall killed two men and buried two others for some hours. On that occasion Mr. Rodigan was one of the rescuers.

THE Yorkshire Winding Enginemen's Association, whose 560 members were expelled from affiliated membership of the National Union of Mineworkers because they refused to merge with the NUM, ceased to exist at the end of May. The membership now forms the Yorkshire division of the newly-formed National Union of Winding Enginemen.

SHEFFIELD UNIVERSITY Council last week awarded the Arthur Markham Memorial Prize, open to all mineworkers in the country, as follows:—£15, Mr. R. G. Hodson, bit grinder, Ferrymoor Colliery, Grimethorpe, near Barnsley, for the first chapter of a novel, "The Uncertain Glory"; £10, Mr. H. C. Haines, coal face worker, Moira (Burton-on-Trent), set of five short poems; £4, Mr. J. Hillhouse, coal face packer, Dalmellington (Ayr), short story; £4, Mr. J. King, boiler chargehand, Doncaster, set of five short poems; £4, Mr. R. Toon, stripper, Linton (Burton-on-Trent), set of five short poems; £3, Mr. P. C. Walters, miner, Cadenden (Fife), short story.

# Durham Miners' Wage Claim Tied to Productivity

RESOLUTIONS pressing for higher wages, a third week's holiday with pay and a seven-hour day underground are on the agenda for the annual conference of the National Union of Mineworkers at Rothesay, in July. Durham miners have put forward the suggestion that wage increases should be tied to higher productivity.

As well as seeking a "substantial" rise for the lower paid, the Yorkshire Area motion asks the executive to press for a third week's annual holiday, while Scotland specifies for the daywage man an increase of 3s. 4d. a shift, or £1 a week.

Miners in the Midlands want negotiations started with the National Coal Board for the placing of as many day-workers as possible on contract rates, or, failing this, some form of incentive payment to be agreed. Derbyshire opposes solving the wages issue "within the ambit of the Coal Board's finances"—which implies a pay demand no matter where the money comes from.

The colliery mechanics, enginemen, and other craftsmen express their dissatisfaction at the last national wage award because it discriminated between the different categories, giving some 15s. and others only 11s. a week. They will ask the NUM executive to obtain equal pay for all men in the same grade.

A plan to extend nationalization of the fuel industries to oil will also be before the conference. The resolution reaffirms the miners' belief that only by implementation of a national fuel policy can the present crisis in the coal industry be solved and its future secured.

# Calderhead Training Centre Supports CTTW

TRAINING schemes of the National Coal Board are featured on a stall prepared at Calderhead Training Centre, Shotts (Lanarkshire), in connection with Commonwealth Technical Training Week. Various items of equipment and a number of publications are among the exhibits.

The equipment includes a 6-in. Raglan centre lathe, which is available for demonstration purposes, and exhibits, including an analytical balance and a microscope, from the NCB's scientific department. The centre piece of the back wall of the stand is a large picture showing the headgear at Bilston Glen Colliery under construction. On each side are photographs of the various departments at Calderhead Training Centre. A shelf carries examples of exercises done by apprentices during the first year basic training at Calderhead, while the left-hand wall is filled with photographs of mining boys during their statutory training at Dungavel Residential Training Centre and Kames Colliery. Posters showing "How a Mine Works" and "How Coal is Won" and a plan showing the coalfields of Britain are among the remaining exhibits.

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LONG SERVICE awards for periods ranging from 20 to 45 years were last week presented to 45 head office and other London establishment employees of the BTR Industries, Limited, group of companies, by the chairman, Sir Walter Worboys.

# THE COAL TRADE

BETTER quality coals are still meeting a ready trade in a good many parts of the country. The normal falling-off in trade generally has been mitigated by the recent cool weather and the small day-to-day stocks held by most people have rapidly disappeared. Merchants are finding no great difficulty in supplying most qualities called for, except for the premium smokeless fuels, stocks of which are not allowed to accumulate to any great extent. The industrial demand remains fairly constant.

### DERBYSHIRE

Cool weather is helping to maintain steady pressure for most grades of household coal, although in many instances quantities indicate that only immediate requirements are being budgeted for by householders. Best and hand-picked coals however are subject to the normal demand at this time of the year, mostly in fairly large quantities for stocking purposes, and supplies are coming to hand at an even rate. The better types of screened cobbles and brights are in fair supply with demand reasonable; cheaper brights remain quite popular, and at the moment sufficient tonnages are being made available to meet demand. Best large nuts are in moderate request, and orders are for small quantities, with adequate availability. Washed medium nuts are in steady request, with a steady flow of supplies to enable current needs to be met. Washed doubles are in fair demand, but supplies are fairly tight.

Domestic coke nuts are not so active, and deliveries are prompt, with some stocks beginning to accumulate at works. Premium smokeless fuels are in moderate demand, but supplies are somewhat tighter than of late, and there is some delay in execution of merchants' orders. Phurnacite is also fairly slow, with demand fairly good. Domestic grades of anthracite are not easy to obtain, and demand is quite good, although there is not a lot of urgency with orders placed.

Industrial demand is fairly steady, and there is a satisfactory flow of coals against current inquiries. Nutty slacks continue to be readily obtainable. Dry screened nuts are in good demand, and deliveries are well maintained. Washed fuels are a little easier now that there is little need for central heating purposes, and on the whole supplies are flowing in a satisfactory manner.

## Coal Traders' Plan to Meet Oil Competition

AIMED at ensuring that coal competes successfully with oil, a five-point plan is outlined in the annual report for 1960 of the National Council for Coal Traders. The council stresses the need for:—Flexibility of operation, so that consumers' individual requirements can be satisfied; careful supervision of coal preparation to ensure consistent quality and size of coal; regularity of supply; a highly-developed advisory and technical service; and a forceful and informative publicity campaign.

The council has offered its support to Mr. Alfred Robens, chairman of the National Coal Board, in his drive to maintain a demand for 200,000,000 tons of coal a year, but, members say, the achievement of this will depend on the board's ability to check further conversions of industry to oil and the maintenance of sufficient expert labour in the pits.

## Consumers Stock More Coal

ALTHOUGH the Whitsun holiday made a difference of nearly 950,000 tons in the output of deep-mined coal, last week's production was an improvement on the comparable week in 1960. The drain on undistributed stocks has resulted in the slight rise recorded over the past month being almost cancelled out, stocks have fallen to some 23,200,000 tons.

In the week before Whitsun consumers' stocks in all sections showed increases and, at 13,178,000 tons, are more than 1,000,000 tons better than a year ago.

There were 573,700 wage-earners on colliery books on May 20, against 607,000 on May 21, 1960, the numbers engaged at the coal face being 214,950 and 231,920 respectively. Total absenteeism (all workers) in the week ended May 20 was 15.45 per cent., compared with 14.58 per cent. in the week ended May 21, 1960. Output at the face was 4.191 tons and overall 1.451 tons in the week ended May 20, compared with 3.972 and 1.414 tons in the week ended May 21, 1960.

The following table gives (in tons) the provisional figures of output of saleable mined coal by division in the week ended May 27, and the tonnage lost through disputes:—

| Division. | Week ended May 27, 1961. | | Week ended June 6, 1960.* |
|---|---|---|---|
| | Total output. | Tonnage lost. | Total output. |
| Scottish .. | 362,000 | 3,000 | 358,000 |
| Northern (N&C) .. | 192,000 | 50,000 | 192,000 |
| Durham .. | 357,000 | 97,000 | 361,000 |
| North-Eastern .. | 473,000 | 326,000 | 451,000 |
| North-Western .. | 207,000 | 28,000 | 227,000 |
| East Midlands .. | 637,000 | 212,000 | 599,000 |
| West Midlands .. | 159,000 | 119,000 | 160,000 |
| South-Western .. | 253,000 | 109,000 | 265,000 |
| South-Eastern .. | 15,000 | 13,000 | 18,000 |
| Great Britain— | | | |
| Deep-mined coal .. | 2,655,000 | 957,000 | 2,631,000 |
| Other deep-mined (including licensed mines) .. | 37,000 | — | 39,000 |
| Open-cast coal .. | 131,000 | — | 124,000 |
| TOTAL .. .. | 2,823,000 | 957,000 | 2,794,000 |

* Comparable week last year.

HARGREAVES (LEEDS), LIMITED—Dividend for the year ended March 31, 1961, is being maintained at 15 per cent. and a one-for-three scrip issue is proposed. Members are told that there is a conditional contract for the acquisition of the entire capital of Smith & Robinson (Leeds), Limited, for £1,300,000. Net profit for the year is £322,884 (£281,483). Directors expect that the current year's profits should be sufficient to cover with an ample margin a 15 per cent. dividend on capital as to be increased.

*Coal Mines (Explosives) Regulations*, 1961

# Explosives and Detonators

CERTAIN new requirements as to the use, in certain circumstances, of explosives and detonators approved by the Minister of Power are introduced in the Coal Mines (Explosives) Regulations, 1961.

The Minister has granted the following approvals under the new regulations, which came into force yesterday (Thursday):—

*(a) Detonators for use in places hazardous by reason of the presence or possibility of the presence of inflammable gas or combustible dust* (approved under Regulation 7 (1)):—No. 6 copper electric detonator, Carrick short delay detonator, No. 6 Hydrostar electric detonator, No. 6 Hydrostar short delay detonator, No. 6 copper delay detonator, No. 6 copper short delay detonator (all manufactured by Imperial Chemical Industries, Limited); No. 6 electric detonator (Vickers-Armstrongs, Limited); Triumph copper electric detonator (Yorkshire Electric Detonator Company, Limited).

*(b) Explosives and detonators for firing by the infusion method* (pulsed infusion firing) (approved under Regulation 39 (2)): Explosives: Infugel (Cooke's Explosives, Limited); Aquadex (Explosive & Chemical Products, Limited); Hydrobel (ICI); Detonators: No. 6 Hydrostar electric detonator, No. 6 Hydrostar short delay detonator (both manufactured by ICI); Triumph electric detonator for pulsed infusion firing (Yorkshire Electric Detonator Company, Limited).

*(c) Explosives and detonators for firing with delay detonators in a cross measure drift, the face of which contains a seam of coal or is in or near waste* (approved under Regulation 48): Explosives: Nobel's explosive 1235 (ICI); Detonators: Carrick short delay detonator (ICI).

*(d) Explosives and detonators for ripping the roof of a dummy gate* (approved under Regulation 49): Explosives: Nobel's explosive 1235 (ICI); Detonators: Carrick short delay detonator (ICI). All instantaneous detonators approved under Regulation 7 (1) (paragraph (a) above) are also being approved for this purpose.

*(e) Explosives and detonators for firing with delay detonators elsewhere than in a cross measure drift or sinking shaft* (approved under Regulation 54 (2)): Explosives: Nobel's explosive 1235 (ICI); Detonators: Carrick short delay detonator (ICI).

*(f) Primers for use following a miss-fire when firing by the infusion method* (approved under Regulations 63 (1) (c) (ii) and 66 (1) (c) (ii)): "Sindanyo" inert primer (Filling Machines, Limited).

The Minister has also amended the approved specification of shotfiring cable. The existing approval summarized on page 214 of the Law Relating to Safety and Health, Vol. I (1957 edition), and the subsequent approval dated May 1, 1958, are revoked. Specifications of the new approval are:—

*(a) Cable for single-shot firing only:* Twin core cable with stranded copper conductors each not less than 0.0009 sq. in. in cross-sectional area, effectively insulated throughout its length for a voltage not less than the voltage at which it is to operate, so constructed as to resist, so far as reasonably practicable, wear and rough usage, and with a yellow external colouring.

*(b) Cable for single-shot or multi-shot firing:* Cable which is: (1) Either twin core cable, with stranded copper conductors each not less than 0.0015 sq. in. in cross-sectional area, or single core cable, with a stranded copper conductor not less than 0.003 sq. in. in cross-sectional area. (Note: This type of cable may not be used for firing single shots except where the single shot is a miss-fire in a round); and (2) effectively insulated throughout its length for a voltage of not less than 1,500 volts applied for five seconds, so constructed as to resist, so far as reasonably practicable, wear and rough usage, and with a white external colouring (except in the case of an armoured cable).

The conditions of the approval prohibit the use of armoured cable for shotfiring except in a shaft being sunk, and require that, in a safety-lamp mine or in a part of a mine where safety-lamps are in use as a temporary precaution, any cable used for multi-shot firing must be free from joints and repairs other than joints and repairs which have been properly made and either vulcanized or moulded.

The new approval makes the following changes as compared with the present law: Single core cable may not now be used for single-shot firing; any cable used for multi-shot firing in safety-lamp mines must be free from joints and repairs, other than properly made joints and repairs; and armoured shot firing cable is now prohibited, except in shafts.

# *"Lip Service" Paid to Mines Safety Campaign*

FOR paying only lip service to the campaign against accidents in the mines, Mr. David Rankin, safety engineer, East Fife Area, Scottish Division of the NCB, last week criticized men and management in the Scottish pits in a circular headed "Honesty in Safety Work." He said: "There are some things a top manager cannot delegate, and one of these is a real interest in safety. He can inspire it, but cannot delegate it."

Planning for safety was meritorious but the subject had to be approached in a realistic manner with the knowledge that many safety programmes had failed because human emotions and quirks of nature had not been taken into account. He went on: "We once thought that if our mines met certain physical standards, success would be sure, but we find mines with very bad conditions having better safety records than mines with good conditions." Times and ideas had changed and only those who were willing to change them could have any measure of success in safety.

Mr. Rankin mentioned situations where insincerity had spoiled progress in programmes, which in the beginning, had been conceived in all honesty. Managers, he said, often wondered why the safety programmes did not succeed. The willingness, however, of mine officials to abide by safety rules was an indication of whether or not they meant to enforce safety.

# Coal Imports Warning for South Wales

IMPORTING cheap US coal would create serious difficulties in the South Wales mining districts and would also have a "very serious" adverse effect on the economic and social planning of the National Coal Board and the country in general, warned Mr. W. Potts, retiring president of the NCB Labour Staff Association, at the opening of its annual conference in Sheffield last Saturday.

He said: "The irresponsible attitude of big business in its mad grab for immediate profit is very apparent. In its request to the government for a licence to import US coal, the Steel Company of Wales, Limited, refers to the erection of new steelworks in West Germany and other common market countries and the competition they are likely to face."

Mr. Potts stated that if 2,000,000 tons of US coal were imported at a price of 16s. a ton cheaper than UK coal a profit of more than £1,500,000 would be made. The cheap coal was available only because of a recession in American industry. "This will sort itself out in the next few months, and then the proposal is purely a short term one for quick profits," he added.

Speaking at the Co-operative Congress at Scarborough last week, Mr. Herbert Jones, a mid-Rhondda miner, said that if the "steel magnates" had their way more pits would close. If it was felt that UK coal was too expensive, the fact remained that it had been far too cheap in the past.

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SANDERSON KAYSER, LIMITED (formerly Sanderson Bros. & Newbould, Limited), holding company of steel manufacturers, of Sheffield—A final dividend of 12½ per cent. makes 17½ per cent. for 1960 on capital doubled by a scrip issue and further increased by the merger with Kayser, Ellison & Company, Limited.

# NEWS IN BRIEF

NEW LONDON ADDRESS of Opperman Gears, Limited, Newbury (Berks), and its associate company Limitorque Valve Controls, Limited, is Dutch House, 307/308, High Holborn, W.C.1 (telephone: HOLborn 0603/4/5).

MACHINE TOOL manufacturers, Alfred Herbert, Limited, Coventry, has been appointed sole distributors in Great Britain for the range of hydraulic vice jaws and clamping fixtures made by Larrad (Hydrajaws), Limited, Coventry.

WORK HAS BEGUN on a third storey for the office block of the Clyde Alloy Steel Company, Limited, Motherwell. The cost of the project is estimated at about £30,000. The company is also to provide baths for steelworkers at a cost of about £40,000.

LARGEST RESIDENTIAL caravan site in the country is being built by Richard Thomas & Baldwins, Limited, and St. Donat's Estates, Limited, at Nash, near Newport (Mon) for workers at RTB's Spencer steelworks. Over 400 families will live on the site.

SECTION chargehand at the Harmondsworth (Middx), works of Black & Decker, Limited, portable electric tool manufacturers, Mr. BRIAN WADE has been presented with a cheque for £200 for a design for armature shafts which eliminate the use of carriers.

SHEET ROLLING PLANT in the Philippine Islands is planned by a consortium consisting of the Elizalde Steel & Iron Company, Elizalde & Company, and the Samar Mining Company. The works, which will cost about £3,000,000, will be the first stage of a full-scale cold rolling mill—with an annual capacity of 72,000 metric tons.

AFTER DEDUCTIONS for depreciation, net profit of the State Collieries in Limburg, Holland, amounted to £9,300,000 (£6,800,000). Total earnings available are £11,100,000. After tax of £3,400,000 and transfering £3,800,000 to reserves a dividend of 20 (13) per cent. is paid on the nominal capital of 125,000,000 Fl owned by the state.

SERVICE DEPOT for Edswan Mazda cathode ray tubes at 92, Oxford Road, All Saints, Manchester 13, is to be closed by Associated Electrical Industries, Limited, from June 2. Service to dealers in the North-west area will be maintained after that date from the AEI CRT service depot at 53, Trafalgar Street, Sheffield 1, under the supervision of Mr. D. A. Ward (telephone: Sheffield 27004).

UNEMPLOYMENT in the UK fell between April and May. There were 299,272 registered unemployed on May 15, or 1.3 per cent. of the estimated number of employees, compared with 1.5 per cent. in April, and the same figure in May, 1960, according to Ministry of Labour figures. Of the total unemployed, 282,233 were wholly unemployed, and 17,039 temporarily stopped from work.

DEPUTATION of workers from James Howden & Company, Limited, engineers and makers of boiler auxiliaries, of Glasgow, has appealed to the Amalgamated Union of Foundry Workers to try to prevent the closure of the foundry. The management has issued a statement saying a final decision has been made to close the foundry, which was established in 1898 and employs 67 workers.

DISCUSSIONS HAVE been taking place between the Ceylon Government and Russian representatives on a proposal to set up an iron and steel factory in Ceylon with Soviet aid. One proposal under consideration is that all the factory plant as well as the materials needed for factory construction should be supplied from Russia. An offer from Canada to establish the steel plant has also been received by Ceylon's Finance Minister.

PEAK OUTPUT and turnover levels were reached by Phoenix-Rheinröhr, the Düsseldorf steelmakers, in the year to September 30, 1960. Crude steel output advanced by nearly a third to 3,180,000 tons. Tube output was up 28 per cent. to 747,000 tons and rolled steel production increased by 30 per cent. to 2,130,000 tons. Turnover of DM 1,783,000 was up by 28 per cent. Net profit for the year amounted to DM 28,980,000.

JURY AT A Birmingham inquest returned a verdict of Death by Misadventure on Mr. Samuel Oldacre (44), a foreman at the Halesowen works of Walter Somers, Limited, manufacturers of heavy steel forgings, etc., who was killed when a 1-ton plate fell after an eyebolt fractured during a lifting operation. A safety specialist stated that the eyebolt showed signs of metal fatigue and it may have been partly damaged before the day of the accident.

ZONE-REFINED TELLURIUM of high purity is now being produced by Johnson, Matthey & Company, Limited. The total metallic impurity content, excluding selenium, is less than 5 p.p.m. and is normally in the region of 1 p.p.m. The selenium content does not exceed 5 p.p.m. It is supplied as half-round bar approximately 1 in. by ¼ in. Further particulars are available on application to the company at 73-83, Hatton Garden, London, E.C.1.

FIGURES RELEASED in New York by the American Iron and Steel Institute show that actual production of raw steel in the US during the week ended May 29 totalled 2,077,000 net tons. This was a 2 per cent. increase compared with the 2,037,000 tons produced in the preceding week. Actual raw steel production in the US in the current year to date totalled 35,089,000 (51,880,000) tons, a fall of 32.4 per cent. compared with the same period last year.

BUILT AT A cost of £2,000,000, new laboratories of the Central Electricity Generating Board, adjoining the Berkeley nuclear power station in Gloucestershire, were opened on Monday by Lord Fleck, chairman of the Minister of Power's Advisory Council on Research and Development. The laboratories will investigate problems arising specifically out of the nuclear power plant. In the past nearly all such nuclear activities have been performed by the Atomic Energy Authority.

NEW OIL TERMINAL and storage installation is being erected at Purfleet (Essex), by Cory Bros. & Company, Limited, a member of the Powell Duffryn, Limited, group. First stage of the project, which will be developed over a number of years, will cost about £1,250,000. Much of the development work will be handled by Powell Duffryn group companies, including Powell Duffryn Technical Services, Limited, Powell Duffryn Engineering, Limited, Pipeweld, Limited, and the MacCleaster Chemical Company, Limited.

FOLLOWING A tour of the South Wales coalfield, a working model of pithead gear was on show last week in Cardiff. The model demonstrated the latest automation method, by the English Electric Company, Limited, of handling coal. It has been inspected by more than 600 senior officials of the South-Western NCB and will visit other coalfields in the UK during the next six months. The English Electric method is claimed to be more reliable than conventional gear, as the electronic equipment has no moving parts and needs less maintenance.

## Appointments

Mr. THOMAS LATTA, senior process engineer at the Scottish Gas Board's Lurgi plant at Westfield, Fife, has been appointed chemical engineer and deputy head of the plant.

Mr. R. R. COOK, manager at South Hetton Colliery (Co. Durham) since 1958, has been appointed manager at Murton Colliery. He started his working career at Eppleton Colliery.

Mr. G. C. RICHARDSON has been appointed export manager of the oversea division of the British Oxygen Company, Limited, a new post created to strengthen BOC's oversea sales activities.

Until recently officer in charge of training at the REME training centre, Mr. J. SWEENEY has joined the Sheffield steel manufacturing firm of Hadfields, Limited, as education and training officer.

At present senior lecturer at the University of Leeds, Dr. J. E. HEMINGWAY has been appointed to the newly-established Second Chair of Geology in the Newcastle Division at the University of Durham, from August 1.

D. R. B. BUZZARD has been appointed Research Director of the National Institute of Industrial Psychology. The Institute's research programme is partly financed by grants from the Department of Industrial and Scientific Research.

From June 30, Mr. D. J. COTTRELL will succeed Mr. G. W. Bodsworth as assistant purchasing agent for the United Steel Companies, Limited, Sheffield. Mr. Bodsworth will remain with the central purchasing department as a consultant.

## *British Electrical Power Convention*

THIRTEENTH annual meeting of the British Electrical Power Convention will be held at Eastbourne from June 12 to June 15, under the presidency of Sir John Pickles, chairman of the South of Scotland Electricity Board. The convention is representative of the 42 principal organizations connected with the British electrical industry, and the proceedings, which will take place in the Winter Garden, have as their theme this year, "Electricity in Prosperity and Welfare of the Nation."

Papers to be read at the convention will include "The British Electricity Transmission System," by Sir Christopher Hinton, chairman of the Central Electricity Generating Board; "Some Aspects of Efficiency and Economy in Distribution," by Mr. R. R. B. Brown, chairman, Southern Electricity Board; "The Electrical Power Industry in Canada," by Dr. A. E. Grauer, chairman, British Columbia Electric Company, Limited; and "British Electrical Manufacture in the National Economy," by Mr. S. F. Steward, director, British Electrical and Allied Manufacturers' Association.

GENERAL REFRACTORIES, LIMITED, chrome, silica, fireclay brick manufacturers, etc., of Sheffield—The company has acquired for cash all the share capital of Arthur Smith (S. and B. Foundry Sands), Limited, a company engaged in quarrying moulding and core sands. The marketing policy of the company will remain unchanged, and it will retain its separate identity.

## Stewarts and Lloyds Report Lower Profit Margins

WHILE reporting no significant change in trading conditions in recent months, directors of Stewarts and Lloyds, Limited, report that profit margins have narrowed owing to increases in wages and material costs, without compensating increases in prices. Consequently, profits for the current year will be lower than those for 1959-60.

It is intended to declare an interim dividend of 5 (3) per cent. on the £27,000,000 ordinary capital in issue prior to the April rights issue, for the purpose only of reducing the disparity between interim and final dividends. The directors expect to recommend a final dividend of 10 per cent. on the ordinary capital as increased to £33,000,000 by the rights issue. A total of 15 per cent. was paid for 1959-60.

## *In Parliament*

### COAL BOARD HOUSING

CONCERN was expressed by Mr. STEPHEN SWINGLER (Lab), at the problem confronting local authorities in areas where the National Coal Board owned housing estates and had recently decided to issue notices to quit to tenants who had left the mining industry. This, he said, might have the effect of considerably putting back the housing lists in such localities.

SIR KEITH JOSEPH, Parliamentary Secretary to the Ministry of Housing, said that his information was that only one case was urgent, and that the council concerned was reviewing that at its next meeting. The Minister, he said, was looking into the whole matter.

### SPREADING TRAINING BURDEN

PROPOSALS for spreading the financial burden of apprenticeship training so that a wider area of industry can be embraced in training schemes for recruits were reported by Mr. John Hare, Minister of Labour. His department and the Ministry of Education has submitted a report on the operation of such a scheme in France.

It is based on a suggestion that there should be an equalization of the cost of financing apprenticeship training between those who provide training and those who do not.

## Mining Still Largest Employment Group in North-East

ALTHOUGH the number of mineworkers in the North-east has fallen steadily since 1948, coal mining remains the largest employment group in the region, according to a review of employment in the area, including Northumberland, Durham, and the North Riding, by the North-east Industrial and Development Association. The number of mineworkers declined from 176,870 in 1938 to 154,443 in 1959, representing a fall from 20.8 to 14.1 per cent. of the total insured population.

The region, however, still employs about one-fifth of the nation's mineworkers. In 1938, 19.9 per cent. of the mineworkers in Great Britain worked in the North-east, while today the figure is 20.2 per cent.

# Exports of British Coal

DETAILS of British coal exports and bunker coal shipments in April, and the totals for the first four months of this year and last, are given below.

| | Month ended April 30. | Four months ended April 30. | |
|---|---|---|---|
| | 1961. | 1960. | 1961. |
| *Categories.* | Tons. | Tons. | Tons. |
| Anthracite— | | | |
| Large | 6,650 | 22,569 | 23,067 |
| Graded | 13,379 | 68,098 | 71,565 |
| Cleaned smalls | 19,673 | 71,725 | 83,271 |
| All other | 25,309 | 97,223 | 125,603 |
| Steam coal (including household)— | | | |
| Large | 33,403 | 263,894 | 194,196 |
| Graded | 19,879 | 168,257 | 89,063 |
| Cleaned smalls | 67,684 | 329,525 | 386,572 |
| Untreated smalls | 119,411 | 343,683 | 452,662 |
| Other | 13,372 | 79,842 | 56,138 |
| Gas coal— | | | |
| Unscreened | 12,213 | 79,133 | 44,126 |
| Graded | 16,003 | 142,203 | 108,895 |
| All other | 2,184 | 22,504 | 11,154 |
| Coking coals | 10,853 | 48,056 | 44,364 |
| TOTAL | 359,913 | 1,736,712 | 1,690,676 |
| *Destinations.* | | | |
| Canada | 2,715 | 11,815 | 4,227 |
| Other Commonwealth countries | 1,600 | 12,787 | 4,976 |
| Eire | 69,851 | 448,194 | 387,618 |
| Finland | 8,224 | 14,580 | 16,757 |
| Sweden | 8,868 | 66,931 | 48,362 |
| Norway | 10,372 | 40,369 | 36,105 |
| Denmark | 58,286 | 487,876 | 383,697 |
| Western Germany | 45,746 | 149,445 | 166,538 |
| Netherlands | 85,298 | 273,828 | 330,655 |
| Belgium | 17,802 | 52,890 | 70,189 |
| France | 18,314 | 62,118 | 98,003 |
| Portugal | 17,140 | 50,858 | 71,182 |
| Italy | 11,004 | 42,984 | 51,546 |
| Other foreign countries | 4,693 | 22,037 | 20,821 |
| Fuel taken on board vessels engaged in the foreign trade (including fishing vessels) for their own use— | | | |
| British flag | 9,886 | 144,472 | 32,829 |
| Other flags | 2,615 | 15,174 | 10,693 |

# *Exports of Coke and Patent Fuel*

THE following table gives figures of exports of coke and manufactured fuels from the United Kingdom during April, and the totals for the first four months of this year and last.

| Products. | Month ended April 30. | Four months ended April 30. | |
|---|---|---|---|
| | 1961. | 1960. | 1961. |
| | Tons. | Tons. | Tons. |
| Gas coke | 30,491 | 199,758 | 225,964 |
| Hard coke | 24,918 | 152,335 | 99,811 |
| Breeze | 19,882 | 130,877 | 104,244 |
| Manufactured fuel | 9,481 | 45,406 | 27,424 |
| TOTAL | 84,772 | 528,376 | 457,443 |

FOOD MACHINERY manufacturers, Peerless & Ericsson, Limited, has transferred its head office, including service, sales, and administration, to Factory Centre, King's Norton, Birmingham, 30.

# *Imports and Exports of Mining Machinery*

ACCORDING to Board of Trade returns, mining machinery (other than portable power tools) valued at £97,539 was imported during April, compared with £83,110 in April, 1960. Imports for the first four months of the year were valued at £536,669 against £355,453 in the corresponding period of 1960.

The appended table contains figures of export values of mining and well-drilling machinery in April and values for the first four months of this year and last.

| Destination. | Month ended April 30. | Four months ended April 30. | |
|---|---|---|---|
| | 1961. | 1960. | 1961. |
| | £ | £ | £ |
| Union of South Africa | 83,930 | 240,372 | 201,631 |
| India | 72,303 | 434,951 | 308,932 |
| Australia | 33,384 | 129,358 | 124,266 |
| Canada | 19,272 | 150,869 | 157,032 |
| Trinidad | 11,106 | 103,921 | 50,068 |
| Other Commonwealth countries and Eire | 91,812 | 528,863 | 559,528 |
| Argentina | 189 | 298,072 | 9,991 |
| Other foreign countries | 289,735 | 946,816 | 1,178,524 |
| TOTALS | | | |
| Well-drilling machinery— | | | |
| Petroleum | 135,318 | 976,007 | 720,381 |
| Other | 29,697 | 119,576 | 187,054 |
| Mining machinery (excluding portable power tools)— | | | |
| Coal-cutters, power operated— | | | |
| Complete | 50,681 | 176,430 | 192,404 |
| Parts | 72,605 | 335,288 | 280,520 |
| Conveyors, underground— | | | |
| Complete and parts | 69,623 | 457,730 | 359,085 |
| Winders, power operated | 46,186 | 190,666 | 243,753 |
| All other | 197,621 | 577,525 | 606,775 |
| TOTAL | 601,731 | 2,833,222 | 2,589,972 |

## Glasgow Apprentice Wins Essay Contest

PRIZES awarded for the best essays on design and layout of the modern engineering factory have been won by apprentices representing the heavy engineering, confectionery, and footwear-machinery industries in a contest, part of Commonwealth Technical Training Week, sponsored by Production-Engineering, Limited, a group of industrial consultants.

First prize was won by Mr. John C. McNeille, who is employed by James Howden & Company, Limited, engineers of Glasgow. He attended the official opening ceremony of Training Week at the Guildhall, London, this week, will visit the £50,000,000 car factory which the PE group is building in Milan, and be the guest of the group during a week's holiday on the Italian Riviera.

IN PARTNERSHIP with the Sawhney organization there, Booker's Engineering Holdings, Limited, group, has announced the incorporation of a company in India called Triveni Engineering Works. It will have a capital of £450,000 of which the group will hold 50 per cent. The new company will set up a heavy engineering works to manufacture sugar machinery under licence from George Fletcher & Company, Limited, Derby, and Duncan Stewart & Company, Limited, Glasgow, both members of the group. Arrangements have also been made to manufacture industrial process turbines under licence from Peter Brotherhood, Limited, Peterborough.

# *Imports and Exports of Iron and Steel*

FIGURES of imports and exports of iron and steel in April are given in the following tables, based on the Board of Trade returns, and including totals for the first four months of 1960 and 1961.

*Total Exports of Iron and Steel*

| Destination. | Month ended April 30. | Four months ended April 30. | |
|---|---|---|---|
| | 1961. | 1960. | 1961. |
| | Tons. | Tons. | Tons. |
| Malta | 637 | 2,486 | 2,155 |
| Sierra Leone | 380 | 1,879 | 4,436 |
| Ghana | 1,838 | 7,799 | 6,611 |
| Nigeria | 5,230 | 22,587 | 27,859 |
| Union of South Africa | 4,948 | 25,080 | 23,142 |
| South-West Africa | 799 | 2,646 | 6,064 |
| Rhodesia and Nyasaland | 3,027 | 7,150 | 13,983 |
| Tanganyika | 2,291 | 2,951 | 9,371 |
| Kenya | 4,051 | 7,173 | 15,190 |
| Uganda | 411 | 548 | 2,022 |
| Mauritius | 332 | 1,425 | 863 |
| Bahrein, Qatar, and Trucial States | 2,135 | 6,078 | 6,813 |
| Kuwait | 2,924 | 1,978 | 7,454 |
| India | 12,696 | 89,905 | 78,524 |
| Pakistan | 6,510 | 25,578 | 16,604 |
| Singapore | 2,499 | 5,623 | 9,019 |
| Malaya | 2,428 | 6,662 | 10,624 |
| Ceylon | 5,854 | 16,895 | 14,119 |
| British North Borneo | 256 | 1,477 | 1,094 |
| Hongkong | 6,366 | 22,887 | 22,482 |
| Australia | 12,877 | 56,791 | 65,228 |
| New Zealand | 21,862 | 31,563 | 104,666 |
| Canada | 12,845 | 78,301 | 42,221 |
| Jamaica | 927 | 9,410 | 6,285 |
| Trinidad | 4,525 | 16,714 | 13,606 |
| British Guiana | 1,427 | 2,692 | 3,715 |
| Other Commonwealth countries | 1,818 | 9,503 | 9,248 |
| Eire | 6,790 | 20,562 | 26,265 |
| Soviet Union | 1,302 | 9,616 | 8,695 |
| Finland | 4,251 | 14,725 | 18,079 |
| Sweden | 18,389 | 72,154 | 63,491 |
| Norway | 11,368 | 45,010 | 42,146 |
| Denmark | 7,310 | 36,505 | 31,377 |
| Poland | 3,536 | 4,464 | 7,261 |
| Western Germany | 7,423 | 61,216 | 31,054 |
| Eastern Germany | 2,308 | 11,434 | 8,396 |
| Netherlands | 12,029 | 46,866 | 43,493 |
| Belgium | 2,224 | 12,537 | 9,302 |
| France | 1,247 | 2,701 | 3,428 |
| Switzerland | 2,544 | 4,259 | 7,121 |
| Portugal | 2,190 | 5,289 | 8,374 |
| Spain | 3,036 | 15,714 | 7,810 |
| Italy | 5,235 | 14,817 | 22,247 |
| Austria | 443 | 1,800 | 1,931 |
| Yugoslavia | 4,535 | 16,368 | 16,085 |
| Greece | 1,599 | 6,314 | 12,393 |
| Turkey | 1,774 | 1,646 | 6,607 |
| Netherlands Antilles | 54 | 1,775 | 333 |
| Portuguese East Africa | 55 | 1,557 | 987 |
| Egypt | 1,438 | 6,292 | 13,458 |
| Libya | 1,045 | 2,545 | 3,350 |
| Sudan | 357 | 4,031 | 3,025 |
| Israel | 1,313 | 7,805 | 7,596 |
| Saudi Arabia | 155 | 179 | 468 |
| Iraq | 1,645 | 8,665 | 19,863 |
| Iran | 4,345 | 27,647 | 9,629 |
| Burma | 423 | 2,949 | 1,825 |
| Thailand | 474 | 2,774 | 2,231 |
| Indonesia | 303 | 11,661 | 2,374 |
| China | 1,615 | 21,139 | 9,405 |
| Japan | 11,515 | 30,264 | 42,416 |
| Philippine Republic | 118 | 4,207 | 1,177 |
| USA | 10,319 | 104,723 | 35,675 |
| Cuba | 41 | 3,886 | 691 |
| Mexico | 387 | 2,752 | 1,654 |
| Colombia | 819 | 3,266 | 4,789 |
| Venezuela | 2,008 | 18,339 | 7,896 |
| Ecuador | 333 | 898 | 1,112 |
| Peru | 1,662 | 2,523 | 3,281 |
| Chile | 213 | 904 | 1,272 |
| Brazil | 1,422 | 7,180 | 4,519 |
| Uruguay | 1,256 | 3,418 | 3,871 |
| Argentina | 22,255 | 38,299 | 50,023 |
| Other foreign countries | 3,362 | 25,780 | 23,055 |
| TOTAL | 292,358 | 1,213,236 | 1,154,928 |

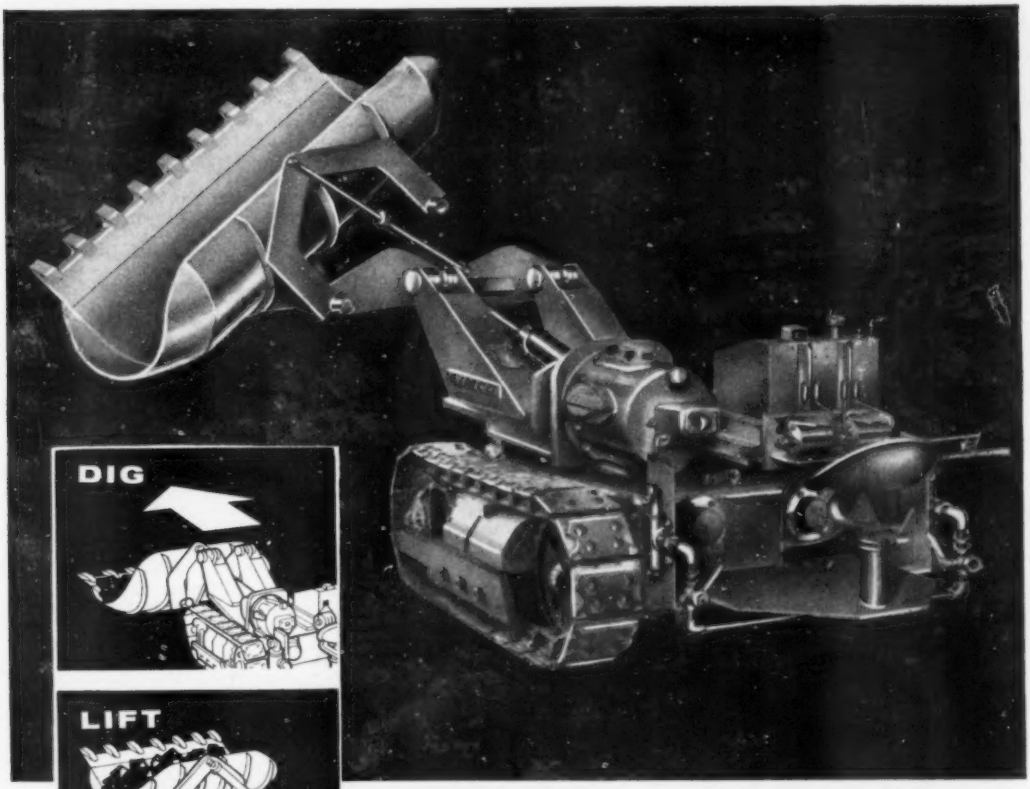
*Total Imports of Iron and Steel*

| From | Month ended April 30. | Four months ended April 30. | |
|---|---|---|---|
| | 1961. | 1960. | 1961. |
| | Tons. | Tons. | Tons. |
| Union of South Africa | 3,517 | 14,957 | 12,424 |
| Rhodesia and Nyasaland | 2,220 | 2,569 | 15,934 |
| Canada | 2,136 | 11,125 | 52,857 |
| Other Commonwealth countries and Eire | 1,120 | 10,545 | 12,023 |
| Soviet Union | 1,751 | 13,548 | 8,570 |
| Sweden | 3,617 | 15,452 | 18,012 |
| Norway | 5,912 | 46,630 | 38,100 |
| Poland | 74 | 8,411 | 492 |
| Western Germany | 1,904 | 57,989 | 13,003 |
| Netherlands | 13,100 | 68,381 | 40,883 |
| Belgium | 2,839 | 35,233 | 19,366 |
| Luxembourg | 796 | 4,962 | 9,644 |
| France | 1,748 | 24,154 | 9,258 |
| Italy | 26 | 8,318 | 230 |
| Austria | 500 | 4,483 | 2,133 |
| Japan | 370 | 2,768 | 2,761 |
| USA | 1,405 | 54,158 | 5,762 |
| Other foreign countries | 1,961 | 8,729 | 4,593 |
| TOTAL | 44,996 | 392,412 | 266,045 |
| Iron and steel scrap and waste fit only for the recovery of metal | 1,191 | 56,719 | 8,090 |

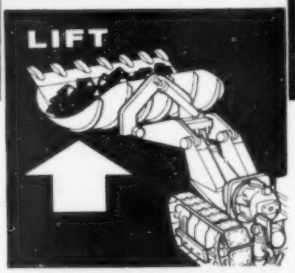
*Exports of Iron and Steel by Product*

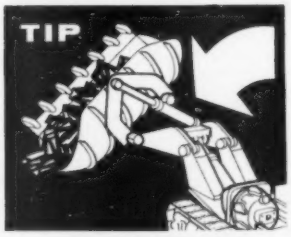
| Product. | Month ended April 30. | Four months ended April 30. | |
|---|---|---|---|
| | 1961. | 1960. | 1961. |
| | Tons. | Tons. | Tons. |
| Pig-iron | 8,174 | 74,280 | 31,538 |
| Ferro-columbium (niobium) | 9 | 57 | 17 |
| Ferro-tungsten | 102 | 406 | 354 |
| Other ferro-alloys | 299 | 3,336 | 1,263 |
| Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms | 16,262 | 19,199 | 24,629 |
| Pieces roughly shaped by forging | 321 | 669 | 900 |
| Iron bars, rods, angles, shapes, and sections | 238 | 552 | 844 |
| Steel bars, rods, angles, sections, and shapes | 55,121 | 217,097 | 241,147 |
| Iron plates and sheets | 79 | 305 | 493 |
| Universal plates | 1,811 | 7,797 | 5,119 |
| Steel plate, 3 mm. and under 4.5 mm. thickness | 2,886 | 13,905 | 12,614 |
| Ditto, 4.5 mm. or more in thickness | 24,797 | 118,706 | 110,226 |
| Blacksheets and blackplate | 37,846 | 108,248 | 124,667 |
| Hoop and strip | 10,789 | 33,837 | 45,455 |
| Tinplate | 32,825 | 199,484 | 146,951 |
| Decorated tinplate | 343 | 1,611 | 2,237 |
| Galvanized sheets | 5,724 | 28,084 | 25,282 |
| Other (incl. tinned sheets, terneplate, and ternesheets) | 3,881 | 11,345 | 14,043 |
| Railway and tramway construction material | 17,170 | 41,875 | 78,246 |
| Wire rods of steel (incl. alloy steel) | 4,855 | 21,313 | 18,112 |
| Wire | 11,763 | 42,967 | 46,840 |
| Tubes, pipes, and fittings | 57,063 | 268,163 | 223,901 |
| TOTAL | 292,358 | 1,213,236 | 1,154,928 |

SECOND REDUCTION in the import duties on goods produced in and imported from countries in the European Free Trade Association (EFTA) will be introduced on July 1 by the Import Duties (General) No. 6 Order, 1961 (S.I. 1961 No. 959), published last Friday. The reduction was brought forward from January 1, 1962, by a decision of the Ministerial Council of EFTA in February. The Order also reduces on June 1 the full rate of import duty on synthetic methanol.






# ANNOUNCING THE NEW EIMCO 623 side dump loader

## for modern mining

- For coal face loading
- Mechanised stable holes
- Mechanised pillar and stall working
- Back ripping and general repair work

Operated either by compressed air or flameproof electric motors, the 623 Side Dump Loader with smooth hydraulic power digs, lifts and discharges sideways onto scraper or belt conveyor.

The big 21 cu. ft. Bucket lifts 2 tons and tips up to 50° to discharge. Front discharge bucket and other materials handling attachments make this machine even more versatile.

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P6439

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# CURRENT PRICES OF IRON AND STEEL

*(Delivered, unless otherwise stated)*
June 1, 1961

## PIG-IRON

**Foundry and Forge Iron.**—No. 3 iron, Class 2, Middlesbrough, £21 17s.; Birmingham, £21 9s. 3d., 10-ton lots or over.

***Low-phosphorus Iron.**—Over 0·10% to 0·40% P, 10-ton lots or over, £23 5s., delivered Birmingham, £23 10s., delivered Grangemouth.

***Basic Pig-iron.**—Delivered in Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics, 10-ton lots or over, £20 3s.

**Hematite.**—Si less than 2%, S & P 0·03-0·05%, 10-ton lots or over; N.-E. (local iron), £23 19s.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s.; Birmingham, £25 13s.; Wales (Welsh iron), £23 19s.

**Refined.**—Cylinder and refined irons, South Zone, £25 9s., North Zone, £25 6s. 6d. Refined malleable, max. 0·10% P, South Zone £26 9s., North Zone £26 6s. 6d.

## MANUFACTURED IRON

*(Bar basis, 2⅝ in. to ¾ in.)*

CROWN IRON: England and Wales (Zone 1), £51 12s. 6d.; Scotland, £51 7s. 6d.; Ireland, f.o.q. Belfast, £54 12s. 6d., all other Northern Ireland ports, £55 12s. 6d., f.o.q. Cable iron, £1 extra.

## SEMI-FINISHED STEEL

**Re-rolling Billets, Blooms, and Slabs.**—BASIC: Soft, u.t., 100 tons and over, £31 15s. 6d.; tested, 0·08-0·33% C, 100 tons and over, £32 5s. 6d.; hard (0·41-0·60% C), 50 tons and over, £33 17s.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting steel up to 0·25% C, 50 tons and over, £35 4s. 6d. SIEMENS-MARTIN ACID (50 tons and over): Up to 0·25% C, £40 11s.; silico-manganese, £43 4s.

**Billets, Blooms, and Slabs for Forging and Stamping.**—Lots of 50 tons and over. Basic, soft, up to 0·33% C, £37; basic, hard, over 0·41 up to 0·60% C, £38 2s. 6d.; acid, up to 0·25% C, £41 14s.; acid silico-manganese, £44 17s.

**Alloy Steel** (25 tons and over).—BILLETS, 3 in., up to and including 10 in., for re-rolling, 0·6/1% Ni, £46; Ni 2·75/3·75%, Cr 0·5/1·10%, £72 17s.; Ni 2·75/3·75%, Cr 0·5/1·3%, Mo. 0·2/0·65%, £83 7s. BARS: 1 in. dia. and up, nickel, £66 7s.; nickel-chrome, £97 1s.; nickel-chrome-molybdenum, £109 14s.

**Other Semi-products, etc.**—Forging ingots, up to 0·60% C, £31 12s. 6d. f.o.t.; tube billets, 50 tons and over, £39 10s.; shell steel billets for direct forging, up to and including 0·33% C, 100 tons and over, £37 15s.; tin bars and sheet bars, 50 tons and over, £32 10s. Wire rods, 3g. to 4g. (all areas except Birmingham, Scotland, Southern Joint Area, and Northern Ireland): Soft basic, 50 tons and over £39 17s.; hard basic, 50 tons and over, £43 8s.; free-cutting, up to 0·25% C, 50 tons and over, £45; acid, up to 0·75% C, 50 tons and over, £54 6s. 6d. Stainless steel billets, 3 in. and larger, 10 tons and over, Austenitic, £219 10s.; martensitic, £131 10s.

## FINISHED STEEL

**Heavy Products** (50 tons and over).—Mild-steel plates, ordinary qualities, N.-E. Coast and Northern Joint Areas and Central Scotland, £40 7s.; medium plates, all areas of England and Wales, £43 16s. 6d.; boiler plates, N.-E. Coast and Northern Joint Areas and Central Scotland, £42 17s.; floor plates, N.-E. Coast, £41 16s. Sections (N.-E. Coast, Midland, and Northern Joint Areas, and Central Scotland): Angles, £38 1s. 6d.; bars (rounds and squares), £40 11s. 6d.; flats, £38 6s. 6d.; joists, £37 17s. 6d.

**Rolled and Re-rolled Steel Products.**—N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over: Angles and tees, 4 in. and under, £40 18s. Channels, 3-in. web and under, £40 18s. Flats, 5 in. wide and under, and rounds and squares, under 3 in.: Untested soft basic, £39 1s.; free-cutting, £44 9s. 6d.; hard basic, £41 19s. 6d.; Siemens-Martin acid, £49 12s. 6d.; spring steel, basic, £44 4s. 6d. spring steel, acid, £53 11s. Glazing tees, £47 0s. 6d. Sash and casement sections, £43 13s. 6d. Gate channels, £50 17s. 6d. Ferro-concrete bars (10 tons to under 500 tons), £39 10s.

**Sheets and Strip.**—Uncoated strip mill coils, hot rolled, under 3 mm. to 12g., mill run, mill edge, 25 tons to under 50 tons, £43 16s.; cold reduced, 17/20g., side trimmed, skin passed, £49 16s. Black sheets, 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 11s. Cold-rolled steel strip, coils, hard temper, not annealed, 20 tons and over, £54 5s. Hot-rolled hoop and strip, u/t soft basic, 100 tons and over, £38.

**Tinplates.**—Cold reduced, hot dipped, 15 tons to under 50 tons, 66s. 8d. per basis box of 108 lb., f.o.t., makers' works. Cold reduced electrolytic, 59s. 9d. per basis box.

**Colliery Rails and Arches.**—Arches, 4 in. × 2½ in. × 2 in., re-rolled, £38 15s.; 3 in. × 3 in., re-rolled, £39; 3½ in. × 3½ in., re-rolled, £40 7s. 6d.; 4 in. × 2½ in. × 2 in., prime £43 7s. 6d. Other sections, prime, £43 12s. 6d. Extra fish-plates, £52 10s. Cambered girders, 4 in. × 2½ in. × 2 in., re-rolled, £37 9s.; 3 in. × 3 in., re-rolled, £37 11s. 6d.; 3½ in. × 3½ in., re-rolled, £38 18s. 6d.; 4 in. × 2½ in. × 2 in., prime, £42 4s. 6d. Other sections, prime, £42 7s. Bonk bars, standard type, prime material, all thicknesses, £38 11s. "W" type bars, prime steel, all thicknesses, £41 1s. Standard type, re-rolled, up to ⅜ in., inclusive, £36 3s. 6d.; over ⅜ in. to ½ in., inclusive, £37 8s. 9d. "W" type bars, re-rolled, up to ⅜ in., inclusive, £38 13s. 6d.; over ⅜ in. to ½ in., inclusive, £39 18s. 6d. Light rails, flange, 25 lb. and under, prime, £40 17s. 6d. Flange rails, 25 lb. and under, re-rolled, £39 15s. Fishplates, £50 12s. 6d.

**Bright Steel** (50 tons and over).—Bars, no analysis or test, £53 5s.; flats, untested, £70 16s. 6d.

**High-speed Tool Steel.**—Finished bars, 5% cobalt, 10s. 10d.; 14% tungsten, 6s. 11d; 18% tungsten, 7s. 9d.; 22% tungsten, 9s. 2d.; 4/6 quality molybdenum tungsten, 6s. 3d.; 6/6 quality molybdenum tungsten, 6s. 5d.; 5/6/2 quality molybdenum tungsten vanadium, 6s. 7d. per lb.

**Rails, etc.**—F.B. rails, heavy 75 lb. to under 90 lb., 500 tons and over, f.o.t., £39 15s.; fishplates for rails 80 lb. and heavier, 50 tons and over, f.o.t., £55 11s.; soleplates, f.o.t., 100 tons and over, £51. Light flange rails, 25 lb. and under, d/d N.-E. Coast, Midland, Northern Joint, and South Wales Areas, and Central Scotland, 50 tons and over, £40 17s. 6d.; fishplates for light rails, 50 tons and over £50 12s. 6d.

## BLAST-FURNACE COKE

*(F.O.T. at Ovens)*

DURHAM AND NORTH-EAST COAST: 177s. 6d. SOUTH WALES: 174s. 7d. NOTTS AND DERBY: 150s. 7d. LANCASHIRE: 162s. 7d. STAFFORDSHIRE: 156s. 2d. YORKSHIRE: 155s. 1d. SCOTLAND: 187s. 11d.

(All prices are subject to quality differentials.)

## STEELWORKS SCRAP

(Plus 5 per cent. in the case of sales by merchants.)

| | Scot-land. | N.-E. Coast. | Mid-lands. | Shef-field. | Lancs. | S. Wales (East) | S. Wales (West) |
|---|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Heavy steel scrap* .. | 229 3 | 228 3 | 220 0 | 226 3 | 226 3 | 227 3 | 232 3 |
| Heavy mixed scrap* .. | 207 3 | 206 3 | 198 6 | 204 3 | 203 9 | 205 3 | 210 3 |
| Heavy steel turnings† .. | 179 9 | 179 0 | 169 9 | 176 9 | 174 3 | 177 0 | 180 0 |
| Heavy cast iron† | 206 9 | 203 9 | 208 0 | 204 3 | 189 3 | 199 3 | 205 9 |
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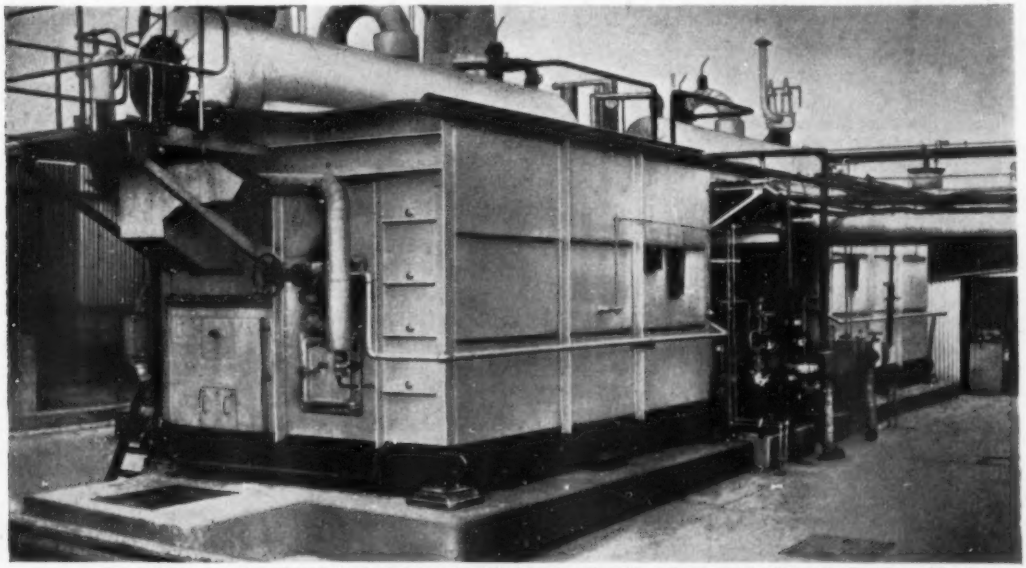

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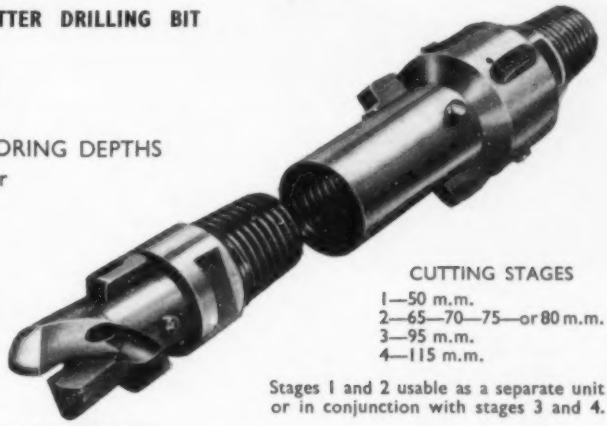

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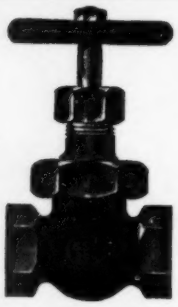

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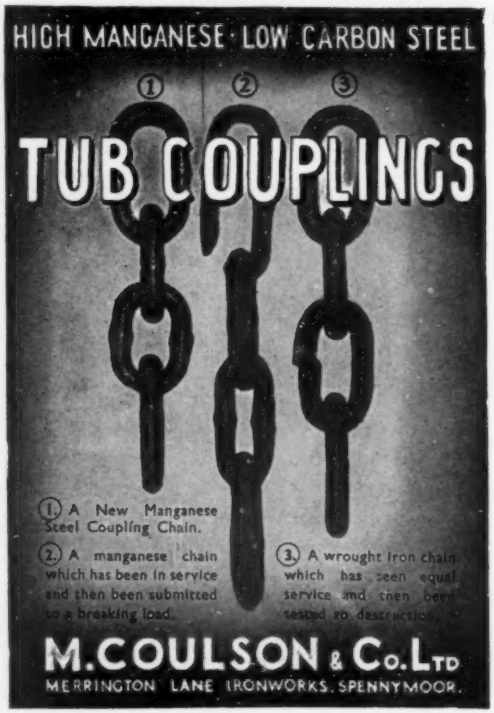

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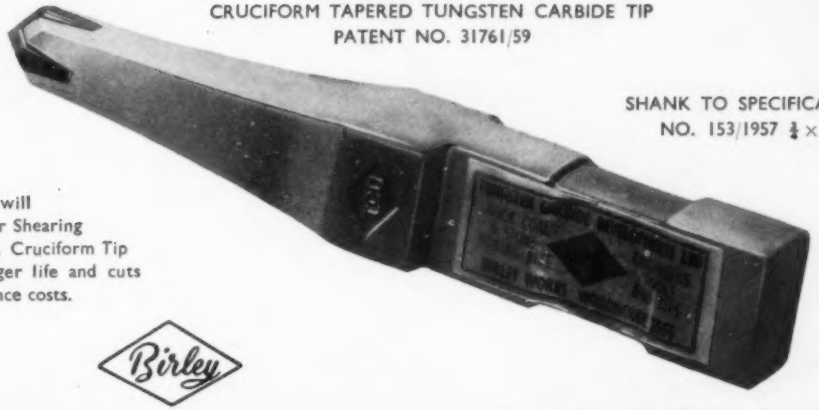

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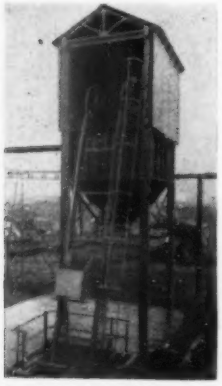

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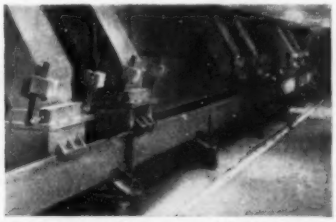

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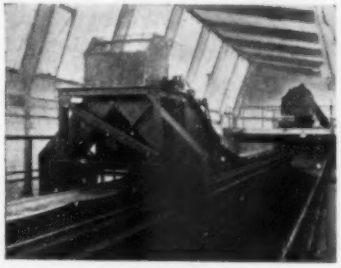

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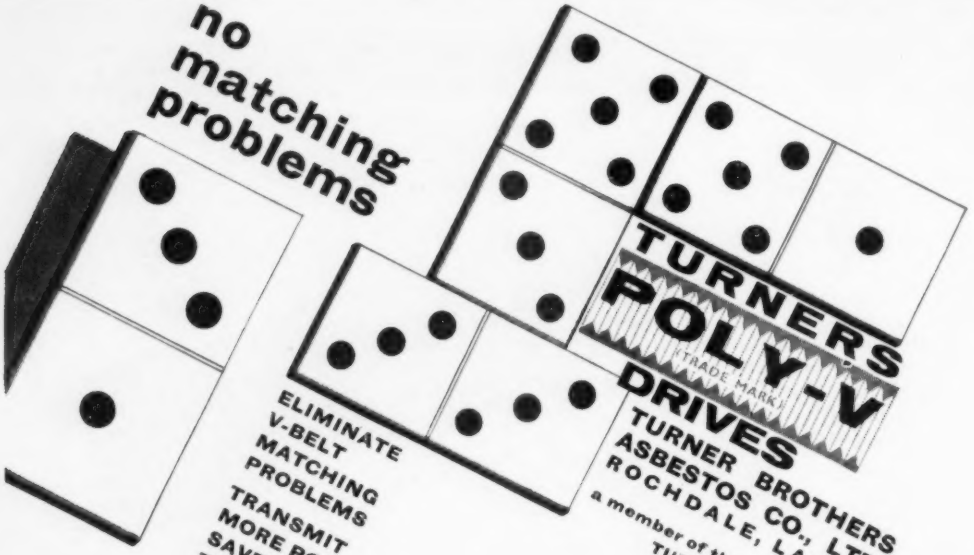


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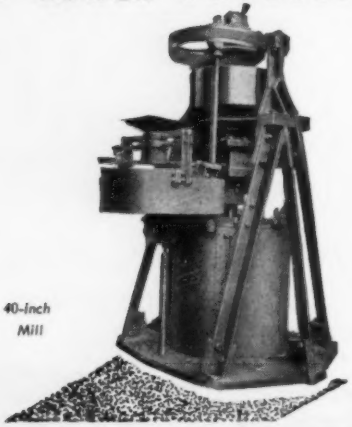

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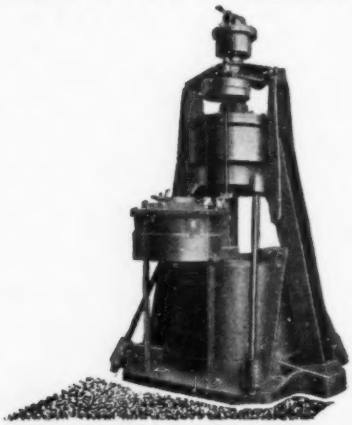

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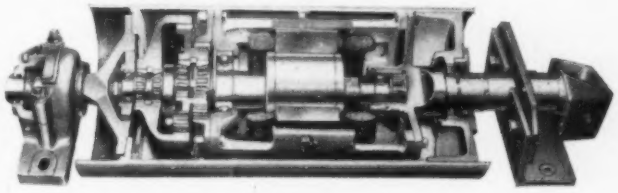

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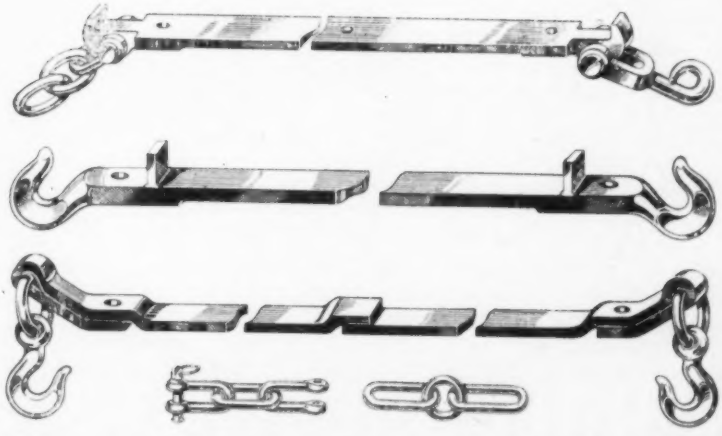

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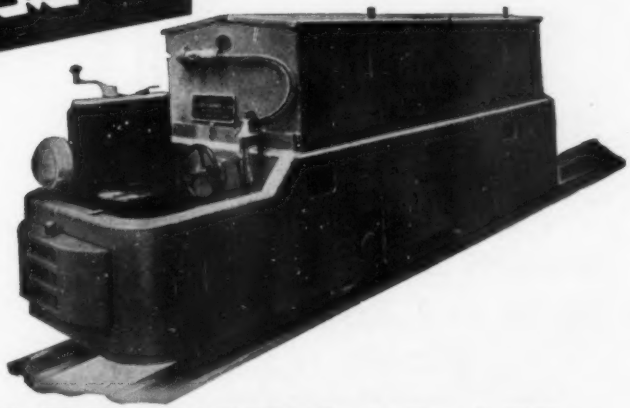

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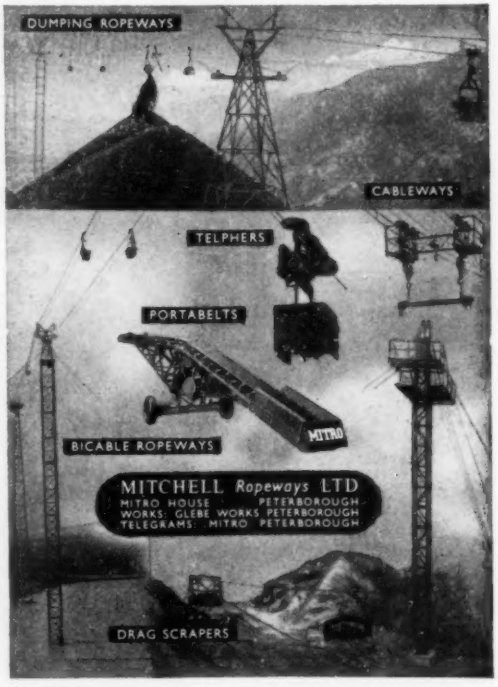

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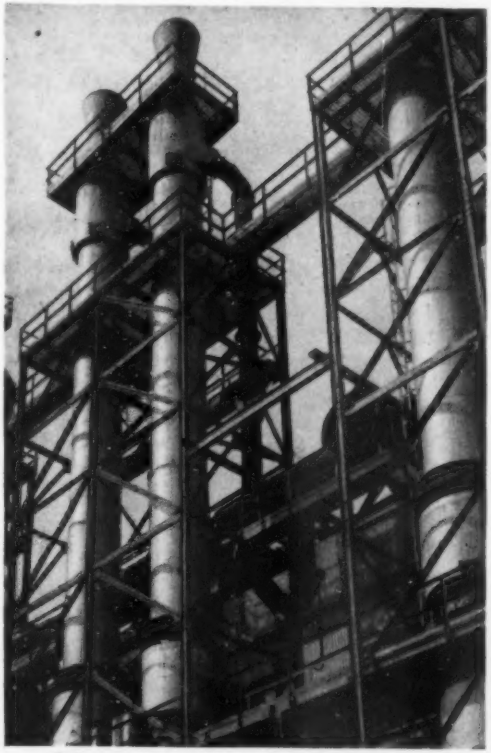

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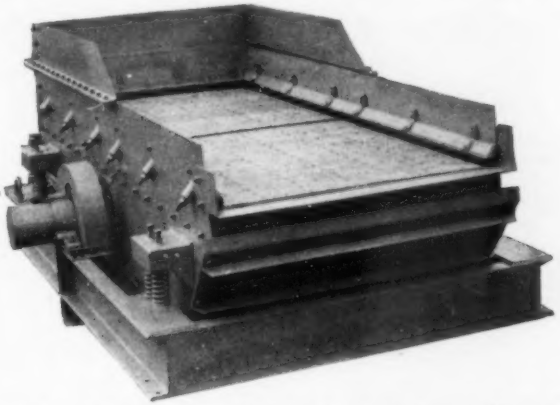

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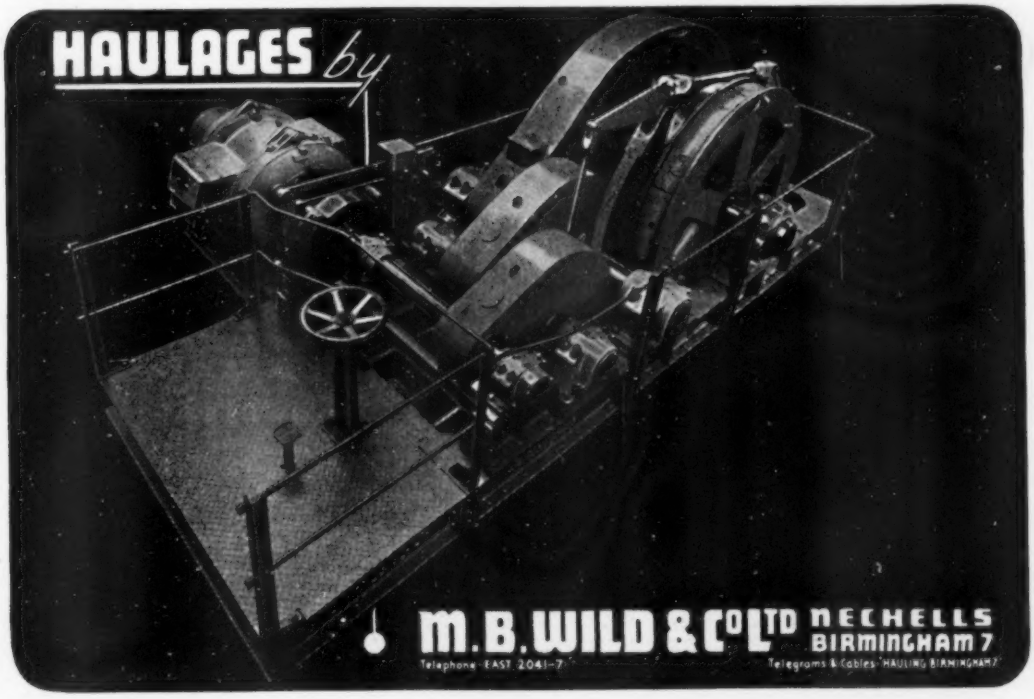

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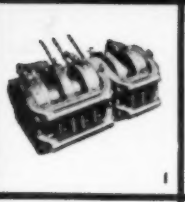
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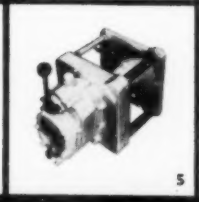
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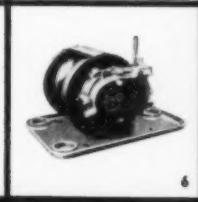
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Compressed Air Engines & Winches.

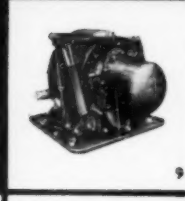
BUXTON FLP CERTIFICATE

PIKROSE

Electric or Compressed Air Haulage Gears. (Double Drum or Single Drum).

7

8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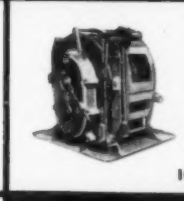
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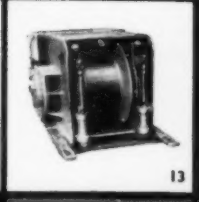
11

Electric or Compressed Air Haulage Gears. (Two Speed or Single Speed)

12


13

Automatic Hydraulic Haulage Gears.

1 S3. 35-75 H.P. Three Drum.
2 S2A. 25-45 H.P. Two Drum.
3 S1. 10 H.P. Rotorair. Two Drum.
4 Size 3. 30 H.P. at 60 lb. p.s.i.
5 Size 0. 3 H.P. Lightweight.
6 Size 1. 5 H.P. Two Speed, Single Drum.
7 Size 1. 5 H.P. C.A. Two Speed, Double Drum.
8 Size 2. 8-15 H.P. AC. Single Speed, Single Drum.
9 Size 2. 8-15 H.P. AC. Two Speed, Single Drum.
10 Size 3. 15-45 H.P. AC. Single Speed, Single Drum.
11 Size 3. 15-45 H.P. AC. Two Speed, Single Drum.
12 H1—Single Drum Automatic Hydraulic Haulage Gear.
13 H3—Single Drum Automatic Hydraulic Haulage Gear.

Many other standard models, arrangements and accessories are available. Further information on request.

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